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SCHOOL GARDENING

By LAURENCE B. HYDE, B.A.

EDITED BY
T. W. SANDERS, F.L.S., F.R.H.S.,
Editor of "Amateur Gardening"

A simple Book for Teaching Boys and Girls in Elementary Schools the Rudiments of Practical Horticulture.

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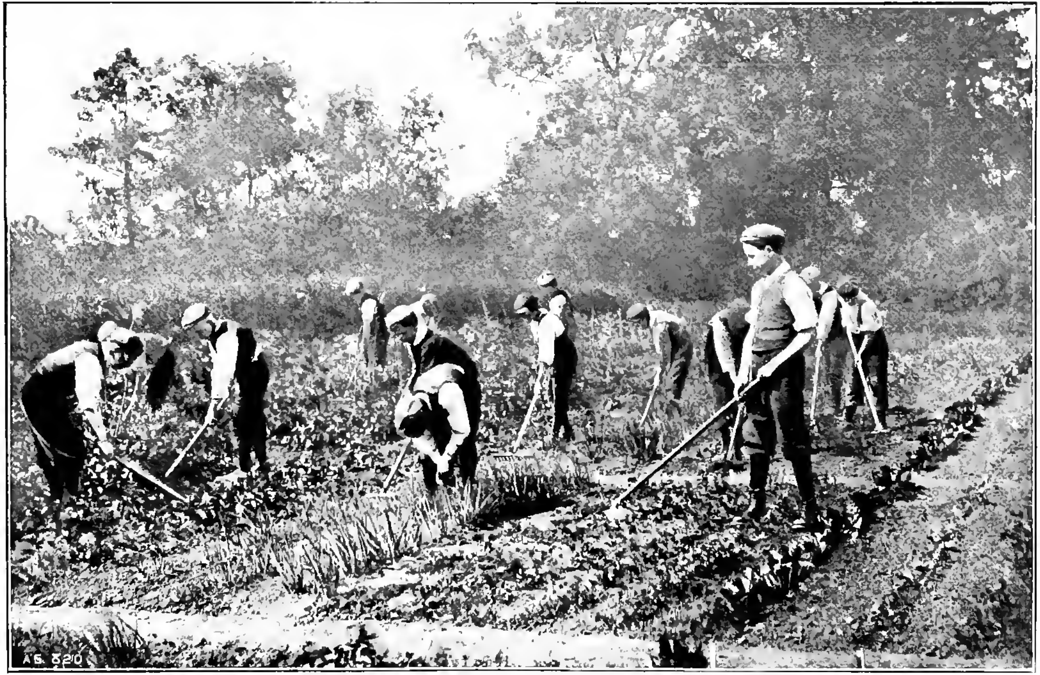

School Boys receiving a Lesson in Weeding. [Photo: H. Livesey.

A photograph of a Village School Garden at Sapecote, near Hinckley, in Leicestershire.

SCHOOL GARDENING

A Simple Book for Teaching Boys and Girls in Elementary Schools the Rudiments of Practical Horticulture in a Clear and Concise Form. Describing How to Lay Out the Plots, and to Propagate and Cultivate Fruits, Flowers, and Vegetables successfully. Also including Indoor School Gardening and a Series of Typical Questions.

BY

LAURENCE B. HYDE, B.A. (Cantab).

EDITED BY

T. W. SANDERS, F.L.S., F.R.H.S.

Editor of "Amateur Gardening.")

ILLUSTRATED.

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AN EDITORIAL FOREWORD.

THE main contents of the following pages formed the subject of a prize essay written by Mr. Laurence B. Hyde, B.A., contributed to, and published in, "Amateur Gardening" in 1912. During and after its publication in the above journal many enquiries were made by teachers interested in school gardening as to whether the essay would be published in book form, and, as there seemed a reasonable prospect of there being a fair demand for such a volume, the Publishers decided to try the experiment of issuing the essay in its present form.

The Author has had considerable experience in teaching gardening as a part of the ordinary curriculum of an elementary school in Essex, and therefore the facts he has given in the following pages are the result of practical knowledge of the subject. At our request he has carefully revised the text, and supplied many new illustrations. The Author does not, of course, profess to have covered the whole domain of practical and scientific horticulture herein, but has rather endeavoured to deal with the simple rudiments of the tillage of the soil, and the propagation and cultivation of such crops as can be easily grown in plots by school children.

A special chapter on Indoor School Gardening has also been added to meet the requirements of those anxious to encourage children in the art of growing plants in pots in schools, or in their homes.

Anyway, it is hoped that what has been accomplished will be of useful service to both teachers and scholars who may engage in the delightful, healthful, and recreative pursuit of school gardening.

THE EDITOR.

AUTHOR'S INTRODUCTION.

IT is obvious that a subject so boundless as School Gardening cannot be minutely dealt with in a short work like this. The Author hopes, therefore, that the few remarks on the various phases of the subject will be of practical help to others who may encounter the same difficulties as he had had to contend with.

In order to obtain the best educational results, a scheme of rural science, including gardening, poultry-keeping, bee-keeping, and carpentry, should be taken. These subjects so interlock and depend one upon another that to take any one of them separately seems a waste of opportunity. The gardener must have some knowledge of rough carpentry. The keeping of fowls uses up many waste products of the garden, and in return supplies valuable manure; whilst no one will dispute that bee-keeping is a remunerative hobby for the poorest cottager to indulge in.

However, to keep to the title, these notes must be confined to the purely horticultural side of the question.

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School Gardening.

CHAPTER I.

TOOLS AND APPLIANCES.

Tools.—The first consideration in commencing a class of this character must be about tools. A good four-prong fork is necessary for every pupil; whilst a spade, Dutch hoe (Fig. 3), drag hoe (Fig. 1), dibber (Fig. 2), rake, and trowel might be shared between two boys; besides which a wheelbarrow, watering-can,

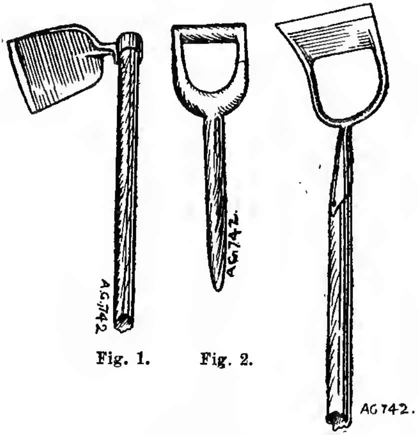


Fig. 1. Fig. 2.

Garden Tools. Fig. 3.

several garden lines, one or two pairs of shears, riddle, and an insecticide syringe are necessary for general use. The tools, with the exception of those of which only one or two are provided for class use, should be plainly numbered, and each pupil made responsible for the cleanliness and condition of certain definite numbers.

Meteorological Apparatus.—The garden should also contain a weather observation station, consisting of weather-vane—often on school—wind-gauge, rain-gauge, barometer, and maximum and minimum thermometer. This is an extremely useful aid to observation and deduction. The daily readings can easily be tabulated in columns, and records kept by the boys. Monthly averages, graphs, and a host of other exercises might be mentioned here in connection with this subject.

Tool Shed.—A building is necessary in which to keep the tools, and to store such things as potato "sets" for planting. If it is possible, it should be brick built, have a window, and be of good dimensions. Inside measurements of 8ft. by 12ft. are not a bit too large. If the tenancy of the garden is only temporary, it is impossible to have such a building. A wooden erection, built in sections, to bolt together, would supply the necessary accommodation in that case.

CHAPTER II.

SITE AND DRAINAGE.

A piece of ground having been secured, the first work will consist of surveying, when the dimensions and levels of the plot will be taken. Before any cultural operations can be commenced it will be necessary to consider the question of drainage. Should this be deficient, it is absolutely necessary that a good system should be adopted if the best possible results are to be obtained afterwards, as superfluous water excludes air, and causes the ground to become sour.

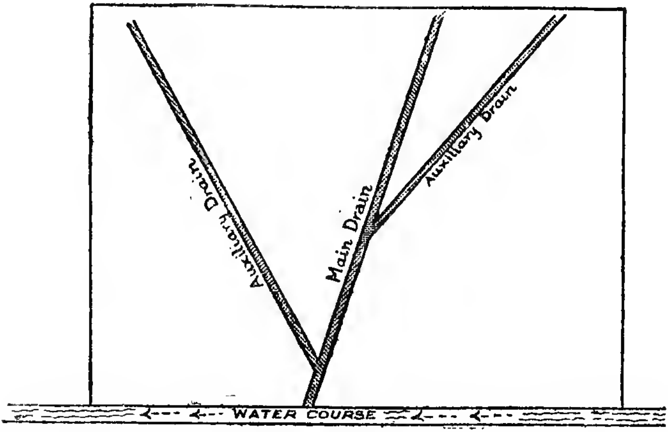


Fig. 4.—Method of Draining.

Draining the Site.—We will suppose that the plot in question is badly drained. New drains must be put in, so that they will fall into a convenient ditch or water-course. The pipes are firmly placed at depths varying from 2½ft. to 3½ft., with a gradual fall to the outlet. Sometimes one drain through the lowest part of the garden will be sufficient; but, if this is not considered enough, a number, as shown in Fig. 4, should be inserted. It is very important that the side drains should join the main drain at as acute an angle as possible. Special spades, called "draining tools," are used for digging out the drains. These could be borrowed from neighbouring farmers. Fig. 5 shows the section of a drain. The pipes used are porous, and about 4in. in diameter. The ends are fitted together loosely, so that water can percolate into the pipes. To prevent clogging of the drains, about 9in. of loose clinker or coarse rubble should be placed over the pipes, and a layer of fibrous vegetable matter, such as green turf or gorse, spread over this to keep out the soil. If it is not considered necessary to insert drain pipes, it will be beneficial to break up the subsoil well to allow water to get away easily.

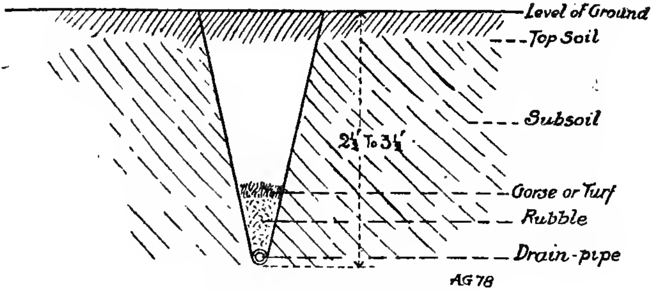


Fig. 5.—SECTION OF A DRAIN.

CHAPTER III.

DIGGING AND TRENCHING SOILS.

Having disposed of superfluous water, it is now necessary that the whole plot should be dug over in some manner. This will depend upon the condition of the ground taken. The probability is that it would be a piece of turf. The easiest and quickest way of commencing would be to have the piece ploughed.

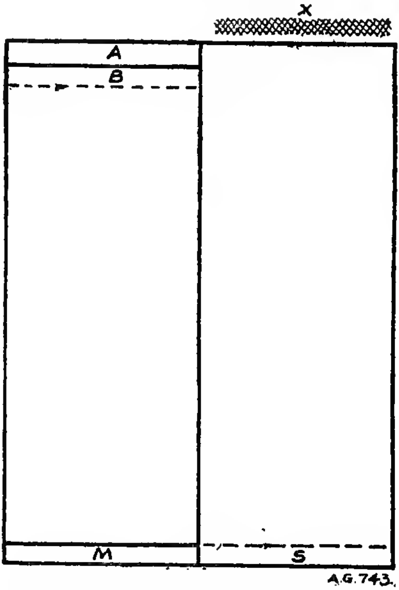


Fig. 6.—Method of Digging Land.

Digging.—Ordinary digging is best carried out as shown in Fig. 6. The plot is divided down the middle, and a spit of soil, taken from A, is placed at X. Manure is placed in the trench so formed, and the soil from the next spit, B, is dug into the trench A, leaving another trench, B. The process is repeated till the end, M, is reached, when the other half is commenced, the soil from S being placed in the trench at M. Finally, the soil at X is dug into the last trench. This method of digging only moves the soil to a depth of about a foot.

Double Digging.—Much better results, however, would be obtained if the whole is double-dug, breaking up the subsoil, shaking out the turf and placing it next, with the loose surface soil on top of this. Whilst the digging is in progress, obnoxious perennial weeds, like bindweed, dock, and thistle, can be picked out and burned. This method entails much time and hard work, and is best performed in autumn. The labour is amply repaid, however, in the improved tilth obtained. The diagram, Fig. 7, shows the method of procedure. The ground is divided into strips, each about 10ft. wide. Each strip is then divided down the middle, and the turf from *a* is shaken out and heaped up at *y*, whilst the loose top soil from *a* is placed in another heap at *x*. The subsoil, *a*, shown in the section of Fig. 7, is then thoroughly forked up, the roots of perennial weeds being carefully picked out; and injurious grubs, such as wireworms, caterpillars, and millipedes, killed as seen. The turf from section *b* is then shaken out and placed on subsoil *a*, to be covered by the loose soil from *b*. Stable manure, and any kind of vegetable matter which readily decays, may also be mixed with the soil as the digging proceeds. The divisions *c*, *d*, *e*, etc., are treated in similar manner till division *r* is reached, at the end of the strip. This will be 2ft. wide, like the first division, *a*. The other half of the strip is then dug, beginning with plot *s*, the soil from

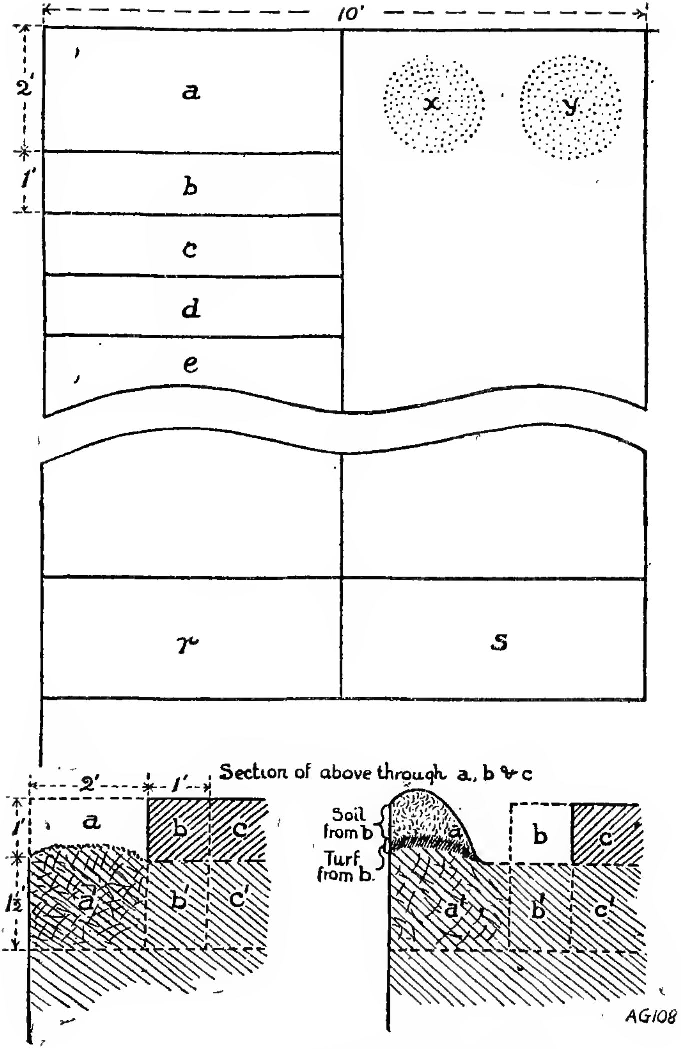


Fig. 7.—Method of Double Digging Land.

which is placed on the subsoil of *r*. At the end of the digging the two heaps taken from *a* will be found sufficient to fill in the last section. It is a good practice to carry out this kind of digging every autumn, the soil being left as rough as possible, so that the frost may do its work during winter. Very little trouble will then be experienced, even on the most heavy soil, in obtaining a good seed-bed in the following spring.

Trenching.—This term is often wrongly applied to double-digging, or bastard trenching, described previously. Trenching consists of bringing the subsoil to the surface and placing the top spit underneath. As a rule it is not advisable to adopt this method, as the subsoil, being insufficiently supplied with plant food, does not give satisfactory crops for several years afterwards. If, however, it is desired to increase the depth of good top soil at the sacrifice of a few years' crops, this is the method used:

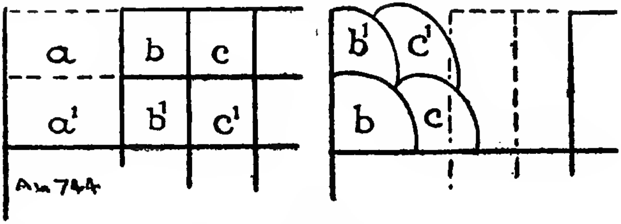


Fig. 8.—SECTIONAL PLAN.

The surface soil from *a* (Fig. 7) is placed at *x*, and the subsoil from *a* at *y*. The surface soil at *b* is then dug into the trench at *a*, and this is, in turn, covered with the subsoil of section *b*. The plot is finished in a similar manner to that described in double-digging, with the exception that the subsoil is always placed on top. The sectional drawing (Fig. 8) will make the method clear. *A*, *b*, and *c* represent the surface soil, and a^1, b^1, and c^1 the subsoil.

CHAPTER IV.

THE SOIL, MANURES, AND ROTATION OF CROPS.

The Soil.—A knowledge of the qualities and functions of the soil is necessary if a pupil is going to carry out intelligent tillage.

What Soil Is.—Soil is a mixture of inorganic and organic matters, the former of which has been supplied by the weathering of rocks by sun, rain, and frost; whilst the latter owes its origin to the decayed animal and vegetable substances present, and which are known as humus.

Silica, lime, soda, potash, and phosphoric acid have their presence in the inorganic part of the soil, and plants could not grow without one or other of these being present. Humus, on the other hand, gives fertility and richness, and, although this alone is not sufficient to grow good crops, its value cannot be overestimated, as productiveness is increased the greater the amount of organic matter present. Its decay produces plant food, makes the soil warm, and helps to keep in the moisture during the hot days of summer. Therefore the addition of vegetable matter in the form of leaves and straw manure is extremely useful, and necessary to improve the tilth of sandy, marly, or clayey soils. Soils, however, like the black lands of the Fens, which are largely composed of decayed vegetable substances, are improved by the addition of inorganic substances such as lime.

A perfect soil is made up of the four constituents, clay, chalk, sand, and humus. The first of these is an invaluable part, as it contains what has been called "essence of clay," which has the property of holding such valuable plant foods as potash, phosphates, and ammonia. Chalk, on the other hand, is in itself a plant food; besides which, being an alkali, its addition prevents soil becoming sour. Sand is not a plant food, and its presence in the soil is an aid to lightness of texture and improved drainage.

The addition of humus is valuable for other reasons besides improving the texture of a soil. Land to which humus is constantly added becomes darker in colour, and so warmer as it absorbs more of the sun's rays. Carbon di-oxide is formed in the process of decay, and this, uniting with the water present, forms a weak solution of carbonic acid, which acts upon the potassic and phosphatic rocks present, setting free their plant foods.

What Soil Does.—Soil serves a double purpose: It affords a resting place for the roots which hold the plants in position, and is also a store from which the roots supply the plant with certain necessary foods in solution. To obtain the best results, therefore, it is needful to see that the soil supplies a constant supply of moisture. Not too little in the dry growing season when more is required, nor too much at other times when plants may easily be "fed up" or the soil become sour.

To do its work properly, soil must be deeply worked and well broken, so that air is admitted and moisture held. A sandy soil is too porous, and must be made heavier by the addition of clay and humus; whereas a clay soil may possibly be too heavy, become saturated with water, sour and cold because of the exclusion of air. It must, therefore, be lightened, as well as drained, by the addition of sand, ashes, and humus, as plants cannot take in food in the absence of warmth and air, and sour soil is fatal to the bacteria which make manures available for plant foods.

Improvement of Soils.—Good deep winter digging, with addition of stable manure, will go a long way towards successful gardening. All soils benefit by the addition of humus, so that any kind of vegetable refuse which readily decays should be dug in. After the crops are up, constant hoeing is excellent, as it maintains a fine tilth on the surface, and this prevents evaporation of water. This is especially necessary in summer. Heavy ground will be greatly improved by the addition of road scrapings and trimmings. The application of chemical manures will depend upon the crops grown, as it is the object to produce leaves in some, and flowers or fruits in others. Lime is an essential constituent of any soil, as it " unlocks " any latent plant food which is present in the soil. The presence of lime may be ascertained by taking a little soil in a test tube and adding dilute hydrochloric acid. The amount of effervescence will be some guide to the amount of lime present. Lime deprives clay of its stickiness. On heavy Essex farms we have frequently come across old lime-kilns which were used by farmers for burning limestone, and so obtaining the invaluable lime for application to their wheat lands.

Artificial Manures.—These may be divided into three classes—phosphatic, potassic, and nitrogenous—and they contain the three chief plant foods. Fruitfulness depends largely upon phosphates, so that phosphatic manures are absolutely essential. Potash is necessary in order to obtain size, colour, and delicacy of flavour; whilst nitrogen encourages growth, and imparts vigour to plants and depth of colour to leaves.

The chief fertilisers of these groups are:

Phosphates—

1. Basic Slag.—The sample should be fine. Especially valuable to soil lacking lime. Not readily soluble, so must be dug in deep during autumn and early winter.

2. Bone Flour.—Has a lasting effect, not being readily dissolved. Should be finely ground.
3. Superphosphate.—May be dug in before cropping, and is applicable as a top-dressing in spring.

Potash Manures—

1. Kainit.—The cheapest form of agricultural potash. Dug in during winter.
2. Sulphate of Potash.—A purified form of kainit; so must be used more sparingly. Can with advantage be applied during growing season.
3. Muriate of Potash (Chloride of Potash).—Being very powerful in its action, it must be used carefully, as much damage may be done if it comes in contact with the roots. Specially useful in certain soils, but should only be used by experienced gardeners.

Nitrogenous Manures—

1. Nitrate of Soda.—Very soluble and powerful. Best used as a weak liquid stimulant, or sprinkled sparingly about growing crops.
2. Sulphate of Ammonia.—Has the same effect as nitrate, but, being retained longer in the soil, it can be applied in one dressing in spring.

Special Manures for Different Crops:

Greens.—Dung, and a dressing of 4lb. kainit and 3lb. superphosphate per square rod (30¼ sq. yards) may be dug into the soil. During growth a top-dressing of nitrate, 1lb per rod, may be applied.

Potatoes.—A mixture of 4lb. superphosphate, 3lb. kainit, and 1lb. sulphate of ammonia per square rod may be dug in. Nitrate as a top-dressing may be substituted for sulphate of ammonia.

Carrots, Parsnips, Beet.—These are best grown on land that has been well manured for a previous crop. If the soil is poor, however, the following may be dug in whilst the bed is in preparation: 3lb. superphosphate, 2lb. kainit, and 1lb. sulphate of ammonia per square rod.

Onions.—Farmyard manure, soot, and a mixture of 4lb. superphosphate and 3lb. kainit per square rod, may be dug into top spit, and during growth two or three top-dressings of 1lb. nitrate per square rod may be beneficially applied.

Peas and Beans.—Animal manure, with superphosphate (7lb. per square rod) dug in several weeks before sowing will give good results.

Fruits.—(a) Heavy land: Basic slag and bonemeal are good winter dressings. (b) Light land: Superphosphate and kainit may be applied in spring.

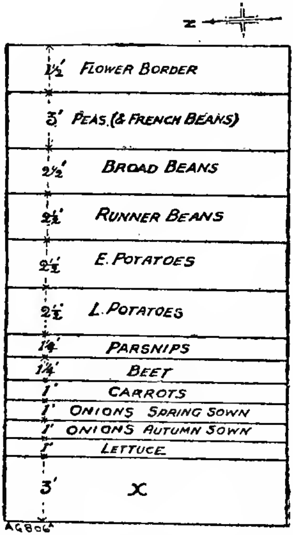
Flowers.—A top-dressing of 3lb. superphosphate and 1lb. sulphate of ammonia per square rod in spring.

"Natural" Manures.—Dung contains all three necessary foods, horse manure being more rich than cow manure, with that of pigs intermediate. Besides the supplying of nitrogen, phosphates, and potash, it adds invaluable organic matter to the soil, and its mechanical effect cannot be over-estimated.

Soot is a valuable fertiliser, and, when it is used, the soil should be dusted until quite black. It is also good to ward off slugs and insect pests, though care must be taken to see that it is not too fresh, or the tender plants may be destroyed by its application.

Another form of manuring is the digging in of crops sown in autumn. Tares, mustard, and turnips are used in this way, and if dug in during March will render the ground very fertile.

Rotation of Crops.—Different classes of plants extract different substances from the soil, so that one crop should be followed by another of a very different kind, which will utilise any manure or plant food left in the ground by the first crop. Celery may be followed by pod-bearers, and these by roots. Plants of the cabbage tribe will follow potatoes. We find it good practice to roughly divide each plot into three parts, keeping vegetables of the same nature together, and not growing them on the same ground two years in succession. If the crops are planted in rows right across the plot, it will be an easy matter to maintain a rotation. The cropping plan of a plot will make this more clear. (See Fig. 9.)



× Either Celery with Radishes on ridges, or Cauliflowers, or Leeks.

Fig. 9.—CROPPING PLAN.

CHAPTER V.

SETTING OUT THE PLOTS.

The whole of the garden having been dug, the next operation will consist of dividing up the ground into plots for boys, flower and fruit borders, and a plot for demonstration and seed sowing. The accompanying diagrams (Figs. 10, 11, and 12) will give some idea of

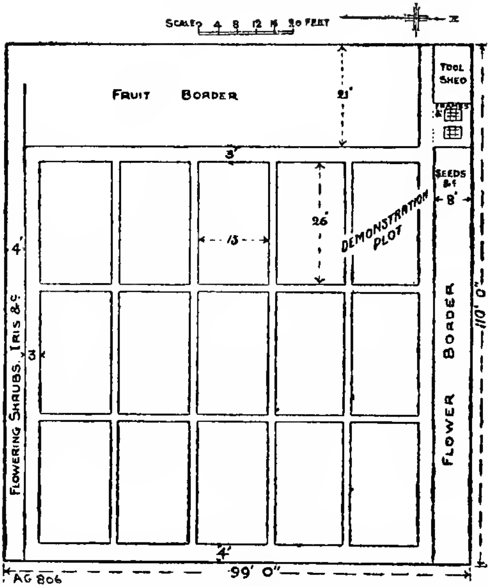


Fig. 10.—Plan of School Garden Occupying a Quarter of an Acre.

how pieces of ground could be split up, though obviously this must depend very considerably upon the dimensions and shape of the garden.

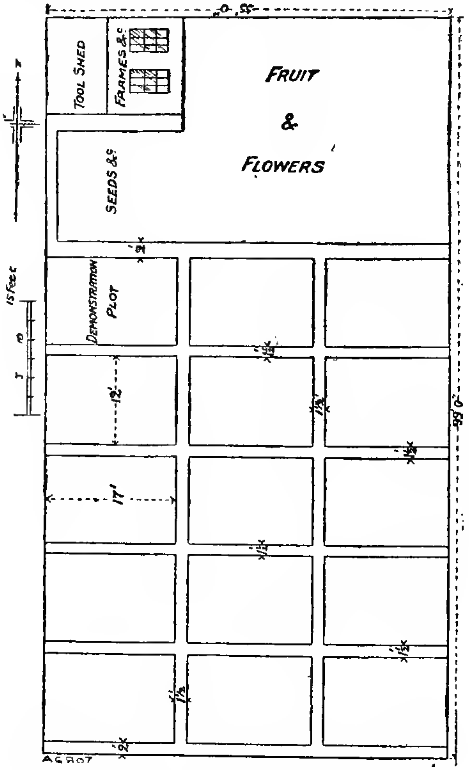


Fig. 11.—Plan of School Garden Occupying One-eighth of an Acre.

Plots.—In determining the number of plots for boys, the size of the school must be taken into consideration, since only boys from eleven to thirteen years of age can become gardeners. The number of pupils allowed to be taken at one time by a teacher is fourteen, so that the plots must number fourteen or some multiple of fourteen, with one extra plot for demonstration and as an example. This latter is a very important matter. Another consideration must be the position as regards the four cardinal points, since it is best that the plots, if possible, should be east and west, so that the rows may run north and south. In this way, each row of plants will receive an equal

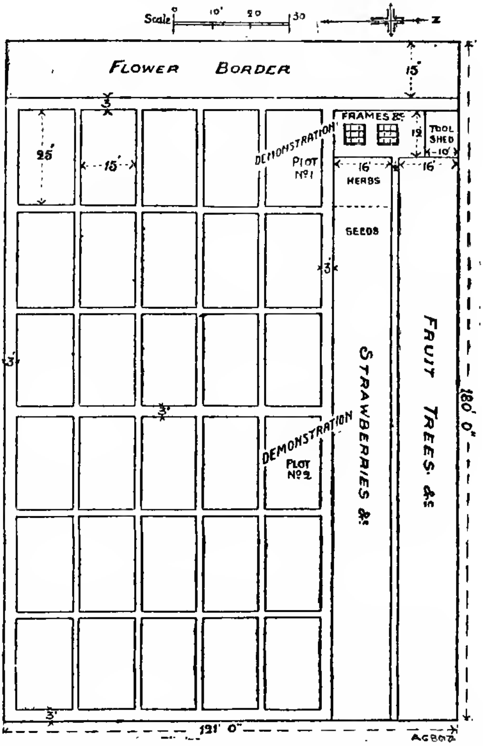


Fig. 12.—PLAN OF SCHOOL GARDEN OCCUPYING HALF-AN-ACRE.

benefit from the sun's rays. Space must also be allotted for fruit and flower borders, on which the best varieties of the most important fruits and flowers may be grown by the scholars.

Each plot should be of good size, about 25ft. long and 15ft. wide being suitable dimensions, and this should be worked by one boy. It is not good practice to have two boys per plot, if it can possibly be avoided, as the educational result is much lessened. Responsibility is divided, competition is less keen, and an opportunity is given for the shirker to blame his partner if anything is found amiss.

Paths.—For paths, by far the most effective medium is grass turf. It greatly adds to the beauty of the garden as a whole, and entails a certain amount of care on the part of each boy.

CHAPTER VI.

VEGETABLES.

In preparing ground for the reception of seeds, the conditions governing successful germination must be carefully studied. In order to germinate well and regularly, seeds require air, heat, and moisture. If the soil has been turned up rough in the autumn, and left to the pulverising influences of frost, wind, and sun during winter, it will, in breaking down in spring, be sufficiently aerated.

Seed Bed.—The first essential is to secure a good seed-bed. The soil must not be too wet or the "seeds" will rot in the ground. It is far better to delay operations than have unsatisfactory results. Broad beans and early potatoes are the first vegetables to be planted. We find it a good practice to plant broad beans with a dibber, about 3in. deep and 8in. apart; whilst early potatoes are planted with a trowel not more than 4in. deep. (See Figs. 13 and 14.)

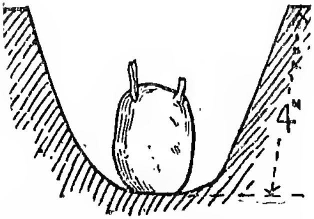


Fig. 13.—Correct Method of Planting a Potato Set.

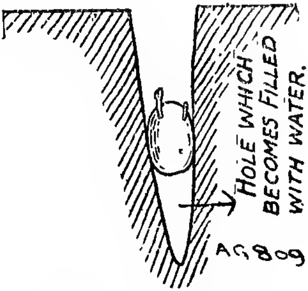


Fig. 14.—Bad Method of Planting a Potato Set.

How to Prepare Potato Sets.—It would be well to say a few words here about the preparation of "sets." When the sets have been secured—if they are being saved from a crop on the ground they should be chosen when the crop is lifted—they should be placed in trays in a light, airy, and frost-proof shed.

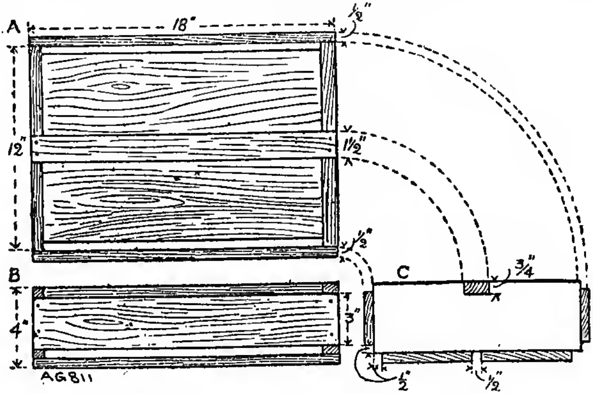


Fig. 15.—Diagram Showing Construction of a Potato Tray.

A good tray is shown in the accompanying sketch. (Fig. 15.) This can be easily made by any handy boy from box-wood, etc. These trays can be stored one on top of another. In spring it will be found that the "sets" sprout from the "eyes." Only two of these shoots should be left on each set—(see 1, Fig. 16)—so that a crop of good, evenly-sized potatoes may be secured. If all the sprouts are left on the "set," a few large tubers and many small ones will probably be the yield. The "sets" should be in as light a place as possible, so that the shoots do not become drawn and weak, like the example shown at 2, Fig. 16. Medium sized tubers, about 2in. long, are the best to use as "sets." We find it a good practice to sprinkle a little soot in the hole that is to receive the "set." The crop lifts clean and free from wireworm ravages.

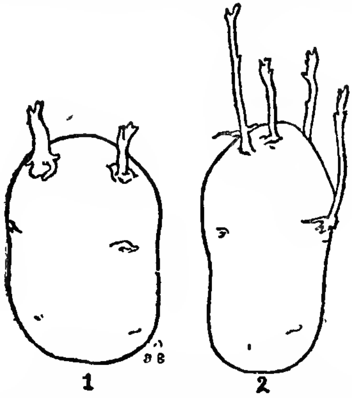


Fig. 16.—(1), A Good Sample of a Properly Sprouted Potato Set. (2), A Bad Sample; Shoots Too Drawn and Too Numerous.

Drills for Seeds.—Many vegetables, such as cabbages, cauliflowers, kale, broccoli, sprouts, and lettuce, are transplanted on to the plot, being either raised in heat, as explained afterwards, or being sown in rows on seed plot. Carrots, turnips, beet, parsnips, onions, etc., are sown in drills on the plot. In order to draw a good drill, it is necessary that a good, fine tilth be obtained. Clay soil especially should not be worked in wet weather, but a suitable opportunity should be seized to prepare the seed-bed. Having obtained the necessary friability of soil, a line should be stretched across the row of plots in the necessary position, and fastened down by each boy pushing his fork over it into the ground. A drag hoe is then drawn along the line with the edge to the cord, making a drill as deep as the seed to be sown requires. (See Fig. 17.) The smaller the seed, the shallower the drill must be. The seed should then be sown, the end of the row labelled with a label similar to that shown at Fig. 18, and the soil raked level.

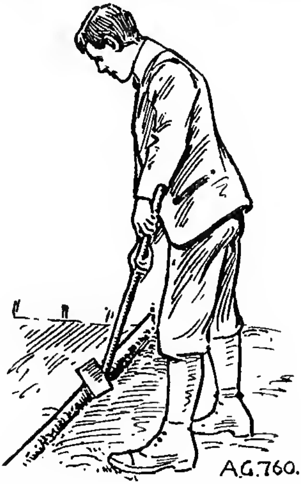


Fig. 17.—Showing Proper Mode of Drawing a Drill.

Sowing Beet and Parsnips.—In the case of beet and parsnips three or four seeds should be placed at intervals of about 8in. along the drill. When the plants are up, all but one at each station should be pulled up. Peas are best sown in a double drill about 6in. wide.

Protecting Seeds from Birds.—Immediately after sowing, some protection against the ravages of birds should be given. A plan that answers well is to stretch black thread at about 3in. from the ground from stakes about 6in. long, set on both sides the row at intervals of two yards.

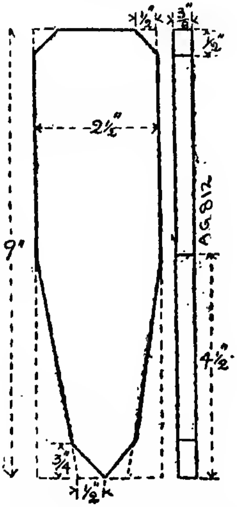


Fig. 18.—Specimen of a Plant Label.

Thinning the Crops.—When carrots are sufficiently large to handle they should be thinned, leaving one plant every 3in. These, in their turn, can be pulled up and used when young and tender, leaving about 6in. between the plants. (See Fig. 19.) Onions must be thinned to about 8in. apart, the thinnings being used as "spring" onions. (See Fig. 20.)

Leeks.—That useful and delicious vegetable, the leek, is easily grown. Seeds are sown on the seed-bed in April, and the young plants transplanted when large enough. It is a good plan to make a shallow trench, about 3in. deep, and then plant with a dibber. After a hole has been made and the plant inserted, a little soil is dropped in, made firm with a stick, and the plant then watered. Very little earthing-up is necessary to secure good, white leeks.

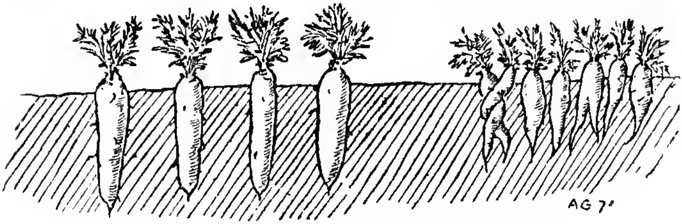


FIG. 19.—A LESSON IN THINNING CARROTS.

Those on the left were properly thinned out and hence have good shaped roots; those on the right were not sufficiently thinned, consequently have ill-shaped, stunted roots.

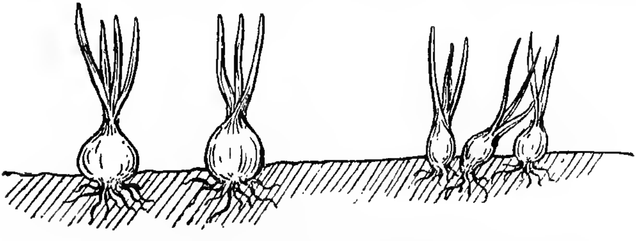


FIG. 20.—THINNING ONIONS.

The two large bulbs are the result of proper thinning; the three small ones show the effect of not thinning out sufficiently.

A Sowing Table.—The annexed tables will give some idea of the vegetables to grow, with the best varieties, distances apart, and periods of use.

Name and Varieties.	Date of Sowing.	Where Sown.	Date of Transplanting.	Distances apart.				Period of Use.
				Rows.		Plants.		
GREENS.				ft.	in.	ft.	in.	
Cabbage, Flower of Spring ...	Early August.	Seed bed.	Early Oct.	2	6	2	0	May to July.
Cabbage, Ellam's Early	March.	Seed bed.	May.	2	6	2	0	Aug. and Sept.
Savoy, Dwarf Green Curled ...	March to May.	Seed bed.	June to Aug.	2	0	1	6	Sept. to Feb.
Savoy, Drumhead	March to May.	Seed bed.	June to Aug.	2	6	2	0	Sept. to Feb.
Red Cabbage (small)	March.	Seed bed.	May.	2	6	2	0	August to October.
Red Cabbage (large)	March.	Seed bed.	May.	2	6	2	0	August to October.
Colewort Cabbage	April-June.	Seed bed.	As ready.	2	6	2	0	October to March.
Brussels Sprouts, Exhibition ...	(Feb. under glass) to April.	Seed bed.	May to July.	3	0	2	6	October to March.
Brussels Sprouts, Aigburth ...		Seed bed.	May to July.	3	0	2	6	October to March.
Brussels Sprouts, Dwarf Gem ...		Seed bed.	May to July.	3	0	2	6	October to March.
Kale, Cottager's	Apl. and May.	Seed bed.	June to Aug.	2	6	2	0	January to April.
Kale, Scotch Curled	Apl. and May.	Seed bed.	June to Aug.	2	6	2	0	January to April.
Kale, Asparagus	Apl. and May.	Seed bed.	June to Aug.	2	6	2	0	March to April.
Sprouting Broccoli, White and Purple	Apl. and May.	Seed bed.	June-July.	2	6	2	0	March to April.
Cauliflower, Early Snowball ...	February.	On hotbed.	End of April.	3	0	2	6	June and July.
Cauliflower, Early London ...	Early March.	On hotbed.	End of April.	3	0	2	6	July and August.
Cauliflower, Autumn Giant ...	March & April.	Seed bed.	May & June.	3	0	2	6	August to Nov.
Broccoli, Self-protecting ...	April.	Seed bed.	June.	3	0	2	6	Nov. and Dec.
Broccoli, Snow's Winter White...	April or May.	Seed bed.	June.	3	0	2	6	Jan. and Feb.
Broccoli, Leamington	April.	Seed bed.	June-July.	3	0	2	6	March to April.
Broccoli, Late Queen	April or May.	Seed bed.	June-July.	3	0	2	6	May and June.

Name and Varieties.	Date of Sowing.	Where Sown.	Date of Transplanting.	Distances apart.	
				Rows.	Plants.
ROOTS.				ft. in.	ft. in.
Potatoes (Early), Duke of York	March to May.	On plot.	—	2 6	10 to 16 in.
Potatoes (Early), Epicure ...	March to May.	On plot.	—	2 6	10 to 16 in.
Potatoes (main), Factor	March to May.	On plot.	—	3 0	10 to 16 in.
Potatoes (main), Up-to-Date ...	March to May.	On plot.	—	3 0	10 to 16 in.
Parsnips, Student (long) ...	Feb. to March.	On plot.	—	1 3	0 8
Parsnips, Intermediate	Feb. to March.	On plot.	—	1 3	0 8
Carrots, Shorthorns	March.	On plot.	—	1 3	0 9
Carrots, Early Nantes	April.	On plot.	—	1 3	0 9
Carrots, Intermediate	April.	On plot.	—	1 3	0 9
Beet, Turnip rooted	March.	On plot.	—	1 0	6 to 8 in.
Beet, Globe	May.	On plot.	—	1 0	6 to 8 in.
Beet, Tap-rooted	May.	On plot.	—	1 0	6 to 8 in.
Onions, Ailsa Craig	Feb. to March.	On plot.	—	1 0	6 in. to 1 ft.
Onions, Bedfordshire Champion	Feb. to March.	On plot.	—	1 0	6 in. to 1 ft.
Onions, James' Keeping	Feb. to March.	On plot.	—	1 0	6 in. to 1 ft.
Onions, Silver Skin (Pickling) ...	Feb. to March.	On plot.	—	1 0	6 in. to 1 ft.
Onions, Giant Rocca	Abt. Aug. 24.	On plot.	Early March.	1 0	6 in. to 1 ft.
Leeks	March.	Seed bed.	June.	—	—
Turnip, Early Milan	March.	On plot.	—	1 0	0 4
Turnip, Snowball	July (following early potatoes).	On plot.	—	1 0	0 4
Turnip, Red Globe		On plot.	—	1 0	0 4
Turnip, Orange Jelly		On plot.	—	1 0	0 4
Turnip, Swede		On plot.	—	1 0	0 4

Name and Varieties.	Period of Use.
Potatoes (Early), Duke of York	June & all year.
Potatoes (Early), Epicure	June & all year.
Potatoes (main), Factor	June & all year.
Potatoes (main), Up-to-Date	June & all year.
Parsnips, Student (long)	Oct. to March.
Parsnips, Intermediate	Oct. to March.
Carrots, Shorthorns	June & all year.
Carrots, Early Nantes	June & all year.
Carrots, Intermediate	June & all year.
Beet, Turnip rooted	Sept. to May.
Beet, Globe	Sept. to May.
Beet, Tap-rooted	Sept. to May.
Onions, Ailsa Craig	Sept. to May.
Onions, Bedfordshire Champion	Sept. to May.
Onions, James' Keeping	Sept. to May.
Onions, Silver Skin (Pickling)	Sept. to May.
Onions, Giant Rocca	Sept. to May.
Leeks	Jan. to April.
Turnip, Early Milan	June to March.
Turnip, Snowball	June to March.
Turnip, Red Globe	June to March.
Turnip, Orange Jelly	June to March.
Turnip, Swede	June to March.

Name and Varieties.	Date of Sowing.	Date of Transplanting.	Method of Blanching.	Period of use.
SALADS.				
Lettuce, Bath Cos ...	About August 24.	Oct. to Feb.	Tie up.	May & June.
Lettuce, Hicks' Cos	—	—	—	—
Lettuce, Webb's Wonderful Cabbage	March and every fortnight for succession.	Soon as ready.	—	June & on.
Lettuce, Paris Cos ...	—	—	—	—
Endive, Batavian ...	June to Aug.	Soon as ready.	By tying up 3 weeks before using	Oct.-March
Endive, Green Curled	—	—	—	—
Celery	March (hotbed).	Into Trench June or July.	By earthing.	—
Cucumber, Ridge ...	April (hotbed), May (outside)	When safe from frost.	—	—
Tomato, Open Air ...	Jan. (hotbed).	When plants threaten to draw up, May or early June.	—	Oct.
Mustard and Cress...	Sown under glass ready 7 to 10 days. Keep moist. Do not cover with soil.			
Radish, Turnip-Rooted	Feb. and every fortnight for succession.		In summer sow on cool, sheltered border (N.).	
Radish, Long ...	—	—	—	—
POD BEARERS.				
Peas, William I. ...	Late Jan.	Distance rows according to height of pea or bean.		
Peas, Chelsea Gem, df.	Late Feb.			
Peas, Gradus ...	About third week in Mar.			
Peas, Duke of Albany	—			
Peas, Autocrat ...	At intervals not longer than a fortnight till Midsummer.			
Peas, Mr. Gladstone	—			
Peas, Late Queen ...	—			
Beans, 1. Broad—Green Windsor Long Pod... ...	Jan. to April.			
Beans, 2. French—Canadian Wonder	Late April to early June.			
Beans, 3. Runner—Prizewinner ...	Mid. of May.			

Table showing quantities of seed required, and depth of sowing:

Crop.	Quantity.	Length grow.	Depth of sowing or planting.
Potato	1 peck	About 50 yds. According to variety and size of tubers.	4 in.
Pea	1 pint	100 to 120 ft.	Early 2 in. Late 3½ in.
Bean (Broad) ...	1 pint	50 to 60 ft.	3 to 4 in.
,, (Dwarf) ...	1 pint	About 150 ft.	3 in.
,, (Runner) ...	1 pint	80 to 100 ft.	3 in.
Beet	1 oz.	80 to 100 ft.	½ to ¾ in.
Onion	1 oz.	150 to 200 ft.	½ in.
Carrot	1 oz.	About 100 ft.	½ in.
Parsnip	1 oz.	,, 200 ft.	½ in.
Turnip	1 oz.	,, 120 ft.	½ in.

Harvesting and Storing of Vegetables.—Some vegetables, including potatoes, carrots, beet, parsnips, and onions, are harvested in late autumn for use during the following winter and spring, and so must be stored in some way.

Potatoes for winter use may be lifted from the ground during the morning of a fine day, and allowed to lie in the open till the evening, so that their skins may harden to prevent the tubers being easily bruised. "Sets" should be chosen whilst the crop is on the ground, tubers being selected from roots which have done well, and the rest stored away. The best method of storing is to place sound tubers in sacks, and store in a frost-proof shed. A sack is easily overhauled to pick out any that may be diseased. If the shed accommodation is not available, the general method is to store in "clamps." The sketch (Fig. 21) will explain the making of a clamp, which should be opened out once or twice during the winter in order that the contents may be examined.

Beet and parsnips may also be stored in clamps, though we have found that parsnips will keep quite well if they are piled up and covered with soil. In fact, in a dry, well-drained garden, they may be left in the ground till required for use, though this interferes with the cultivation of the plot, and so is not to be recommended in school gardens. The leaves of beet should not be cut off, but screwed off by hand. Carrots may be kept by storing in dry sand in a shed.

Onions.—Many successful growers of this vegetable are at a loss as to the best method of storing. The most common methods are—(1) on shelves or trays, (2) in net-bags, and (3) roping (Fig. 22). The last is by far the best method if it can be successfully accomplished. The first method takes up too much room, whilst in the second the bulbs are not easily looked over. The following is what we consider to be the best method of roping. The onions must be carefully harvested, the tops being perfectly dry before any attempt is made to rope. The roots, adhering soil, and any loose outer skin are first removed. A piece of three-ply rope, about 3ft. long and ½in. thick, is procured, and a knot tied at one end. The rope is then split into three strands. (Fig. 22, i.) An onion is laid along each string,

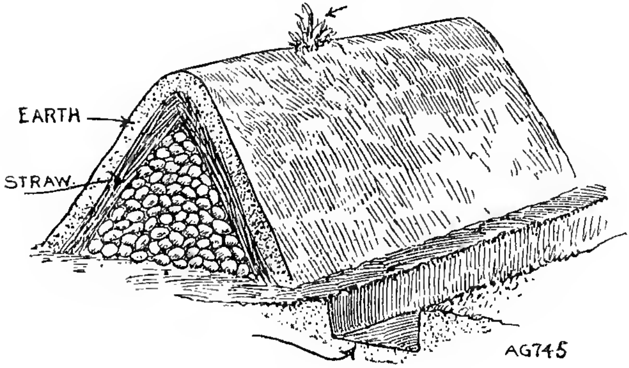


Fig. 21.—A Potato Clamp.

the bulbs towards the knot and three are plaited together, the tops of the onions going with their respective strings. (Fig. 22, ii.) This process is repeated until a rope of onions about 2ft. long is made. The three strands are then tied together at the end A (Fig. iii), and the whole rope and onion tops tied with string as close as possible to the last bulbs. (B, Fig. 22, iii.) Thus

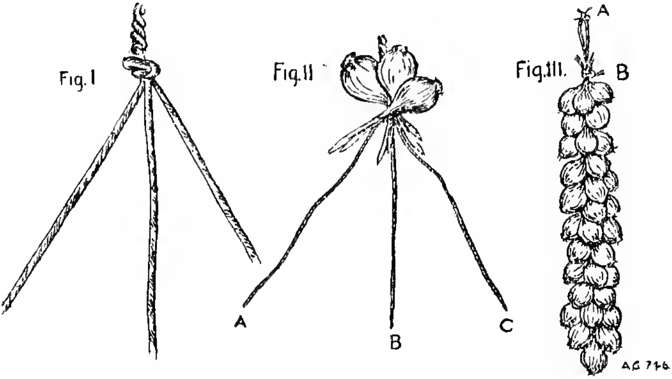


Fig. 22.—Method of Storing Onions in Ropes.

a loop will be left by which to hang up the rope. The presence of the rope prevents the string of onions from breaking, and the bulbs can easily be detached as required for use without the whole thing coming to pieces. The process will be made easier if the beginning of the rope is secured to a post or nail in the wall, about waist height.

CHAPTER VII.

WEEDS.

"One year's seeding means seven years' weeding."

THERE is much truth in this old adage. Most weeds are annuals, and, if allowed to do so, will produce multitudinous seeds. Besides this, when weeds are growing amongst crops, they appropriate their share of plant food from the soil, and, if sufficiently numerous, cause plants to be "leggy," since they keep out light and air from between the rows.

Hand Weeding should take place on every possible occasion, and the pupils should be encouraged not to let any opportunity for eradicating weeds slip by. Perennial weeds, like bindweed, thistles, and equisetum, should be constantly pulled up with as much root as possible. Perseverance will ultimately have its reward in their complete elimination. Annual weeds are easily kept in check between the rows by the constant use of the hoe, those actually growing in the row being pulled up by hand to avoid damaging the crop. In autumn, after the plots are cleared, however, soft, sappy weeds like groundsel and chickweed may be allowed to grow, provided that they are dug in before seeding.

Hoeing.—Too much stress cannot be placed on this invaluable operation. Many, if not most, gardeners hoe to kill weeds, and unconsciously at the same time perform the very important work of keeping a fine state of tilth on the surface of the ground. This is far better than constant watering, as it conserves the moisture in the soil by preventing evaporation. A dust-like surface layer of two inches should be constantly maintained. The best tool to use for this double purpose is undoubtedly the Dutch hoe (see Fig. 3, p. 9), which is one of the gardener's best friends if properly and sufficiently used.

CHAPTER VIII.

FLOWERS.

Flowers may be divided as follows:

- (1) Perennials
  - (a) Flowering shrubs.
  - (b) Herbaceous (including bulbs).
- (2) Annuals
  - (a) Half-hardy.
  - (b) Hardy.
- (3) Biennials.

Flowering shrubs, such as Philadelphus coronarius (Mock Orange), red and yellow-flowering currants, spiræas, hydrangeas, deutzias, broom, guelder rose, and lavender, should be propagated from cuttings made in autumn, and pruned into shape each year. They can with advantage be planted at intervals near the back of the flower border.

Roses should have a special bed to themselves.

Perennials.—Herbaceous perennials should be placed according to height, sunflowers, Michaelmas daisy, phlox, montbretia, irises, chrysanthemums, delphiniums, columbines, calceolarias, campanulas, pentstemons, coreopsis, carnations, pinks, goat's-rue, doronicum, geums, Gypsophila paniculata, and Madonna lilies are all fairly high growers, and can be distributed on the border. Lower-growing plants of this class are arabis (double and single-flowered), alyssum, aubrietia, and various mosses, which will go well to clothe a rockery. Bulbs, such as narcissus, crocuses, snowdrops, hyacinths, and tulips, do well between rose bushes. When the clumps of the foregoing become too large they should be divided in March. Chrysanthemums should be lifted during the latter part of that month, and only one rooted shoot from each clump replanted. This will ensure against deterioration of flowers.

Half-hardy Annuals. — Half-hardy annuals should be sown in early March in pots and raised on a hotbed. When the seedlings are large enough to handle, they should be pricked off about 2in. apart in boxes, grown on, hardened off in a cold frame—(see Fig. 23)—and planted out during late April and May. Sweet peas grown in pots on a hotbed and afterwards planted out, bloom early, though they can be sown in the open ground in March. Some annuals which can be sown in this manner are Phlox Drummondi, nemesia, gaillardia, zinnia, stocks, asters, nicotiana, antirrhinum, lobelia, verbena, annual sweet williams, and pansies. These give a profusion of brilliant flowers early in the year.

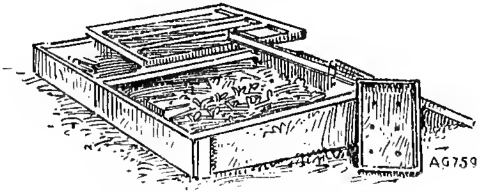


FIG. 23.—A COLD FRAME.

Hardy Annuals.—Hardy annuals should be sown direct on the border, in position according to height, during the latter part of March and April. When the seedlings are well up they should be thinned out. Gypsophila elegans, sweet sultans, jacobæa, godetia, candytuft, linum, nasturtiums, annual coreopsis, and mignonette are a few which are suitable for cultivation in any garden.

Biennials.—Canterbury bells, sweet williams, and wallflowers are best treated as biennials, being sown in July and planted out the following spring. Good plants of wallflowers may be obtained by planting out the young seedlings 1ft. apart on a spare bed, and lifting to flowering quarters early the following spring. Only low-growing plants—not exceeding 2ft.—should be grown by the boy on his plot.

CHAPTER IX.

SEEDS AND SEEDLINGS.

Soil.—The soil to be used for raising seedlings must have certain qualities. It must be light, porous, and warm, but need not contain much plant food. An admirable soil is obtained by mixing two parts loam, two parts leaf-mould, and one part silver sand. The first of these constituents is obtained by stacking turf and allowing it to rot. On breaking up after being in the stack a year or two, a splendid sample, full of fibres, should be obtained. Leaf-mould is made by burying leaves, preferably those of oak or beech. Two pits are used, each being a rectangular hole about 2ft. deep. Boys are sent out to gather leaves, which are pressed into the pit, and then covered with soil. The hole is not disturbed for quite eighteen months, hence the necessity for two pits. Silver sand is very cheaply purchased. In preparing pots for the reception of seeds great care should be taken to see that sufficient drainage is present. (See Fig. 24.) After the pot has been firmly "filled" with soil, it is watered, and allowed to stand a short time before the seed is sown.

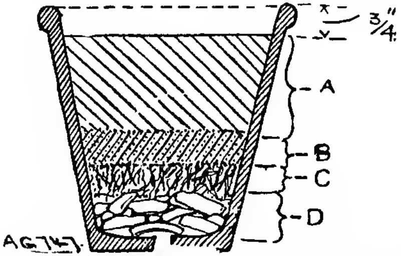


Fig. 24.—Section of Pot Prepared for Seed Sowing.

A. Fine soil. B. Coarse soil. C. Rough fibre soil. D. Drainage.

Seeds and Germination.—A seed may be said to have two parts:

(1) A dormant young plant in embryo,

(2) A store of food for the young plant at commencement of its active life.

In order that growth may take place, three conditions are necessary—air, moisture, and warmth. The last is supplied by the hotbed. Under favourable circumstances a seed first sends out a tiny rootlet, or radicle, which is succeeded very shortly by a shoot, or plumule (Fig. 25), the seed-leaves of which are often very unlike the ordinary leaves of a plant. During this portion of its life the young plant receives nourishment from the seed, hence plant food is not necessary in the soil at this stage.

Seed Germination.—Following is the average time required for the seeds of vegetable crops to germinate:

Number of Days.		Number of Days.	
Asparagus	14 to 24	Lettuce	6 to 12
Beans	7 to 14	Onion	10 to 16
Beet	9 to 18	Parsley	15 to 26
Cabbage Family ...	6 to 10	Parsnip	15 to 22
Carrot	12 to 20	Peas	10 to 18
Celery	10 to 18	Potatoes	16 to 24
Cucumber	7 to 15	Radish...	7 to 14
Endive	7 to 16	Spinach	12 to 18
Herbs	7 to 14	Turnips	6 to 12
Kohl Rabi	6 to 12	Vegetable Marrow ...	7 to 15

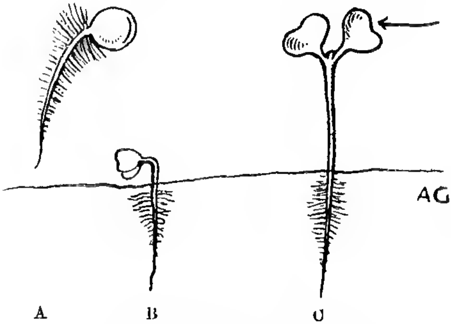


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Fig. 25.—Seed Germination.

A. First stage; growth of the radiole. B. Second stage; development of the plumule. C. Seed leaves or cotyledons.

Depth of Sowing.—This depends upon the size of the seeds. If small seeds are sown too deeply, their tender shoots may not be able to push through the covering soil; whereas large seeds, like peas and beans, must be sown sufficiently deep to obtain the moisture requisite for their germination, as they need much more than smaller seeds. Some tiny seeds, like those of lobelia, need not be covered at all.

Boys are very curious to see the various stages of germination, and will even go so far as to pull up seeds that have been sown some time. To satisfy this curiosity the following will be found an interesting experiment to practise in school. A large glass jam-jar is procured, and a cylinder of blotting-paper is fixed inside it so that the paper presses against the sides of the jar. The cylinder is then filled with wet sawdust, and seeds—e.g., beans, peas, wheat, maize, etc.—are pushed between the blotting-paper and the glass. The jar is placed in a warm place—the shelf over a fireplace is excellent—and developments watched, careful note being kept of the results. The following are a few facts which will be easily observed.

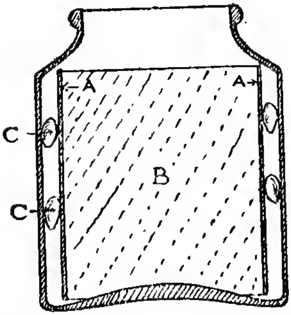

Fig. 27.—Section of the Jar.

A. A. Cylinders of blotting paper. B. Damp saw-dust. C. C. Seeds in position between jar and blotting paper.

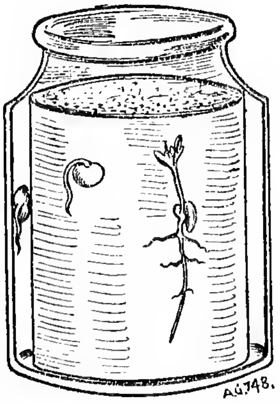

Fig. 26.—Glass Jar Containing Germinating Seeds.

(1) Swelling of seeds due to moisture.

(2) Root appears first; its colour; when rootlets grow.

(3) Seeds grow in whatever position placed, root always turning downwards.

(4) Number and shape of seed-leaves. (See Figs. 26 and 27.)

In dealing with tiny seedlings, a person, especially a boy, is tempted to pick out the larger ones for growing on. This is a mistake, as the smaller and weaker-looking seedlings often turn out to be the choicest plants.

The Hotbed (Fig. 28).—A load of fresh straw manure (horse) should be placed in a square heap of dimensions more than sufficient to accommodate the frame. The heap should be turned and watered several times, and then trodden firm, especially where the frame is to rest. When the frame is placed in position, sufficient heat will be generated to germinate seeds of half-hardy annuals, celery, cauliflowers, cucumbers, marrows, and tomatoes. Air should be freely given on warm days. The tomatoes may be sown in boxes, each seed being inserted about 2in. from its neighbour. When the rough leaves appear, each plant should be placed in a small pot, and then potted on as the growth requires. During this stage tomatoes do not require stimulating manure. All side shoots should be nipped out right through the growth of this vegetable. When the plants are sufficiently large, which will probably be about the end of May, they should be hardened off

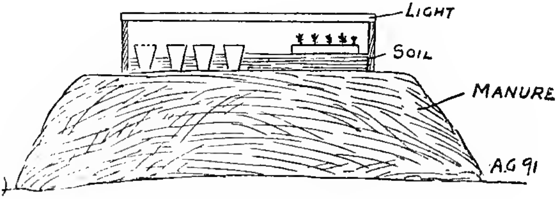

Fig. 28.—A Hotbed.

and planted in a separate bed, each plant being staked. We find it a good practice to allow each boy to have one plant as his special property.

Marrows and cucumbers are planted in small pots, one seed in each. As they grow they are potted on, in a good compost of fibrous loam, sand, leaf-mould, and decayed manure, until they are sufficiently large to be planted out in the open.

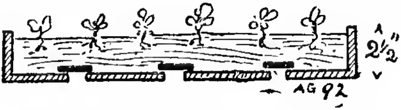

Fig. 29.—Section of a Seed Box.

The earlier cauliflowers are treated exactly like half-hardy annuals—i.e., when the seedlings are sufficiently large to handle, they are pricked off into boxes and gradually hardened off, to be planted in the open at the end of April. They should occasionally be dusted with soot to prevent the egg-laying of the cabbage root fly, which inserts its eggs in the stems of the young plants.

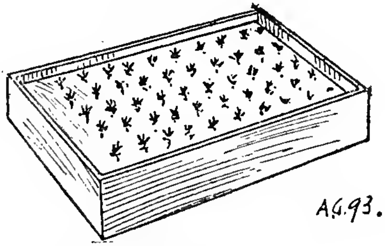

Fig. 30.—A Seedling Box.

Celery seed should be sown in pots, transplanted into boxes (see Figs. 29 and 30) when sufficiently large to handle, again transplanted on a bed of decayed manure (from hotbed) 4in. deep, which has been covered with a layer of soil 2in. thick (Fig. 31). Meanwhile, the trench should be prepared (see Fig. 32), and when the plants are large enough they can be lifted with a good ball of soil at the roots and transferred to the trench. In this manner little check is experienced. As the plants grow they should be earthed up to secure good blanched stems, the leaves being held together during the process.

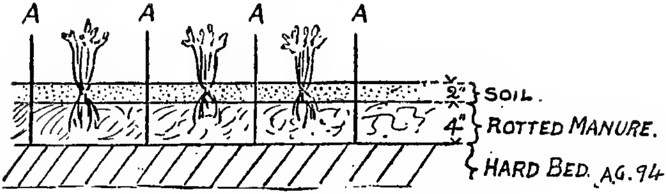

Fig. 31.—SECTION OF A CELERY BED.

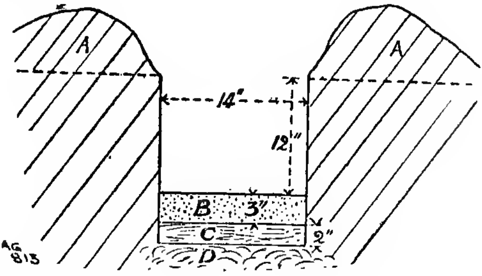

Fig. 32.—SECTION OF A CELERY TRENCH.

Hardening Off.—It is very necessary that plants raised on a hotbed should be thoroughly hardened off before planting in the open. The pots or boxes should be placed in a cold frame, the lights of which, after a few days, may be left slightly open at night, increasing the space until they are uncovered during the night.

CHAPTER X.

PROPAGATION.

Cuttings.—Bush fruits, flowering shrubs (in the open), also carnations, pentstemons, calceolarias, and antirrhinums (in a cold frame) may be propagated in this manner, plants similar in character to the parents being the result. In all cases the cuttings are inserted in autumn, because at that season the "callus," or deposit of cellular tissue from which roots grow, is quickly formed.

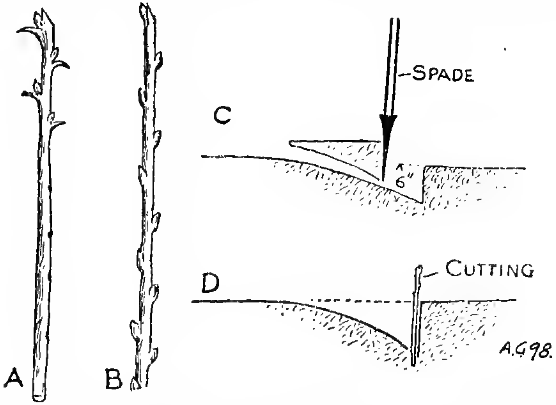

Fig. 33.—A. Prepared Cutting of a Currant or Gooseberry. B. Black Currant Cutting. C and D. Method of Planting Cuttings.

In making cuttings of bush fruits, good firm shoots of the same year's growth, over a foot long, are selected in early autumn. The next treatment will depend upon the habit of growth of the plants. Black currants fruit on new wood, so that the growth of as many shoots as possible must be encouraged. To do this, all buds are left on the shoot. The weak top is removed by a slanting cut just above a good, firm bud, and the bottom cut straight across under a bud. Red currants and gooseberries fruit on spurs which are formed on old wood, so that they are best grown on stems. The

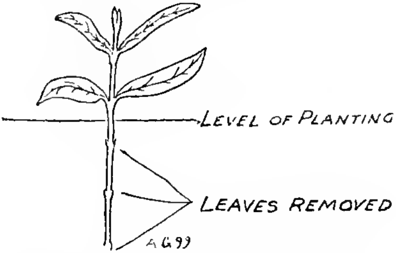

Fig. 34.—CUTTING OF A PENTSTEMON.

fruit also by this method of growth is kept clear of the ground. In order to obtain this, a cutting is prepared similar to that of a black currant, except that

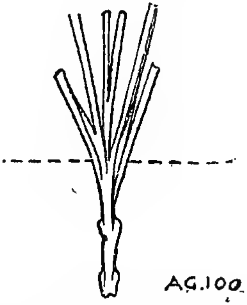

Fig. 35.—CUTTING OF A CARNATION.

all the buds but three or four at the top are removed. This will prevent suckers in the after-life of the bushes.

All cuts should be made with a sharp knife, so that the wounds may quickly heal. The prepared cuttings are next planted in rows about 1ft. apart, and firmly pressed in with the foot. (See Fig. 33.)

Cuttings of red and yellow flowering currants are prepared in like manner, whilst those of other flowering shrubs can be prepared according to the type of plant required. It is a good plan during winter to regularly go over the bed of cuttings and replace firmly any that the frost may have loosened.

Cuttings in Cold Frames.—It will be noticed that pentstemons, antirrhinums, marguerites, calceolarias, and carnations make shoots at the base of the flowering stem. These are the shoots to be used as cuttings, and should be from 4in. to 6in. long. The bases are cut just under a bud, and the lower leaves removed (see Figs. 34 and 35). The cuttings are then inserted in the frame, and the surface covered with sand. Sand should form a preponderant constituent of the soil in which they are planted.

The frames should be kept closed for a few days to conserve moisture, as the cuttings do not take it in as fast as it evaporates from the leaves. On sunny days during winter the light should be removed, so that the young plants may not damp off. These cuttings should make nice bushy plants, to be transferred to flowering quarters in April.

Budding.—This process is usually applied to roses, though fruit trees may also be operated upon, especially plums, which are generally treated in this manner. A bud of a particular variety is inserted in a "stock," which imparts vigour to the plant.

(1) Dwarf Roses.—These are usually budded on brier stocks, which can be obtained (a) by making cuttings in autumn, as in the case of gooseberries, or (b) from seedlings raised from the seeds contained in the "hips" of the common dog-rose. July and early August is the season for this operation, when the shoots are more than half-ripe. It is important that the bud should be inserted as low as possible, so that between one and two inches of earth are removed from the base

of the stock to be treated. It will be found that the bark here lifts more easily than higher up the stem, and when the earth is replaced the junction of "scion," or imported bud, and stock will be covered, so that the rose itself will be encouraged to send out roots. The correct season for inserting buds may be determined by trying to break off the spines. If they do not come off readily, either the wood is not sufficiently ripe or is too dry, in which case the plant should be well watered a day or two before budding. This will encourage the sap to rise. Buds should be taken from the present year's growth, and good stout buds from the lower part of the stem, or from below a full-blown bloom, should be used. The wood should be taken from the bark, leaving only the green bud. This "trick" can be easily acquired by practice. When the bud has been prepared, it may be kept in the mouth of the operator, so that it does not dry whilst a slit for its reception is being made in the stock. The slit is a T-shaped cut made in the bark of the stock as near as possible to the ground. A sharp budding-knife is used. The bark is then raised by the end of the haft

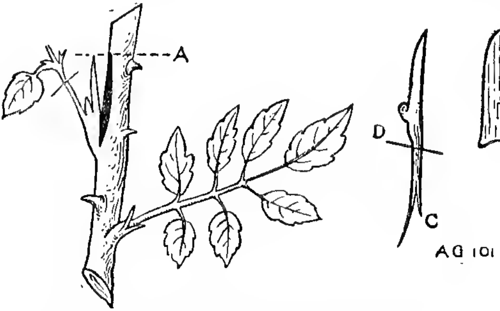

Fig. 36.—Preparing the Bud.

A. The bud or shield partly cut from the shoot. **B.** Bark torn away instead of being cut right through. **C.** The strip of bark turned back so that the wood can be removed. **D.** Bark cut off.

of the knife, the bud inserted, and tied securely with raffia. The sketches, no doubt, will make the matter perfectly clear. (See Figs. 36, 37, and 38.)

(2) Standards or Half-standard Roses.—For stocks, young, healthy briers should be secured from the hedgerows in November. The roots should be trimmed, and the briers planted at distances of a foot in rows a yard apart. They should then be topped to about 3ft. in height. When the stocks begin to grow, two or three strong shoots near the top of each should be selected, and the rest of the growth rubbed off. These young shoots are ready for budding when the bark separates easily from the wood. Buds are inserted on the top of the shoots near the stem, in a similar manner to that described for dwarfs. It is advisable not to bud all the branches on a plant at once, but to leave one or two in case the buds first inserted do not grow. (See Fig. 38.)

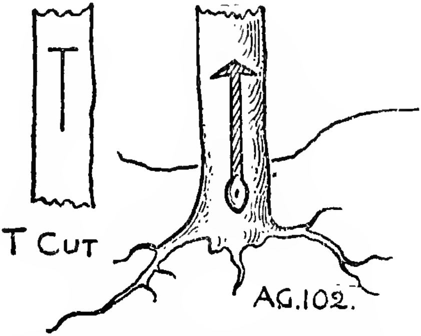

Fig. 37.—Budding a Dwarf Rose.

Showing the T cut in bark and the bud inserted beneath the bark.

Fruit trees are budded in a similar manner.

Grafting.—Different varieties of apples and pears are grafted on to what are called "stocks." Apples may be grafted either on the " Paradise " or " Crab " stocks. The former is used for dwarf trees, which are suitable for small gardens, and which come into bearing about three years after grafting. This stock develops numerous fibrous roots near the surface of the soil, and is highly recommended, as it gives a quicker return than the crab stock, which is used when large orchard trees are needed. Pears are grafted on " Quince " or " Pear " stocks, the former acting much like the paradise stock, and the latter like the crab.

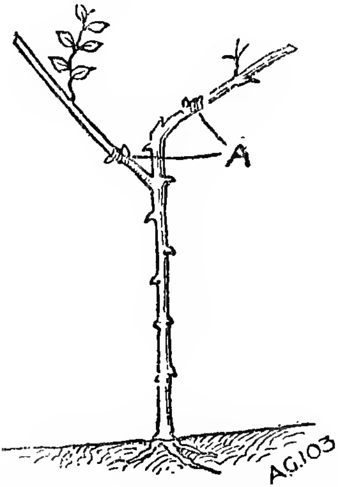

Fig. 38.—Budding a Standard Rose.

A. Buds inserted in the shoots.

Once we visited the orchard of a friend who had planted trees alternately on paradise and crab stocks in the apple rows, and on quince and pear stocks in the rows of pears. The sight was an object lesson. All the trees were six years old, and those on paradise and quince stocks were loaded with fruit, whilst those on crab and pear stocks were much larger trees with scarcely a fruit on them.

The stocks may be propagated by cuttings or layers, if a parent stock is possessed. They may, however, be bought very cheaply from nurserymen.

The "scion" (Fig. 39A) is a piece of the previous year's growth of a desired variety, which is grafted on to the stock. The operation takes place when the sap is freely rising in April. The scions have previously (February) been cut, carefully labelled, and laid in the ground, with their tips protruding. This keeps them back until the sap in the stock is freely moving. In early April the stock (Fig. 39B) is cut down to about 2in. of the ground, and the soil in the immediate neighbourhood is scraped away. The scion is then prepared. It is cut across the top slantingly, near a bud, so that

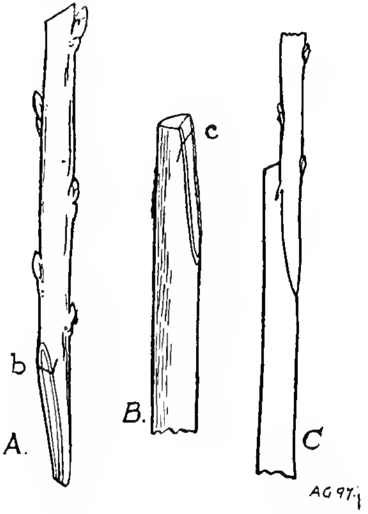

Fig. 39.—Whips or Splice Grafting.

it is about 6in. in length. A piece about 2in. long is next sliced off the other end, so that it gradually tapers. A small upward cut is then made (C, Fig. 39). A similar slice is also taken upwards from the stock, and a downward cut made at c, B (Fig. 39). The wedge formed at B, A (Fig. 39) is then fixed in the cut at c, B (Fig. 39), so that the cambium layers of the stock and scion are together, as shown at C (Fig. 39). The two are then firmly bound together with raffia, and the joint covered with some substance to keep out air and water. Clay is very often used for this purpose, but this is not satisfactory. A good grafting-wax can be made as follows: Four parts resin, two parts beeswax, and one of tallow are heated together in a tin. The "wax" thus made can be reheated when required for use. The top of the scion should also have a little of the wax applied to it. When the graft has been completed, a stake should be fixed to prevent the scion becoming detached. In the following winter the raffia should be cut in order that growth may not be restricted.

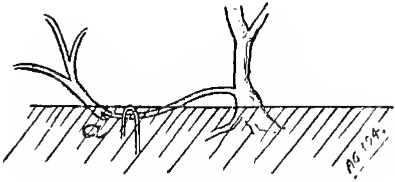

Fig. 40.—METHOD OF LAYERING.

Layering.—This process of propagation is specially suitable for carnations, and the stocks for apples and pears. Roses (climbers and many hybrid perpetuals and teas) may also be propagated in this manner. The sketch (Fig. 40) shows the manner of performing layering, which is best done in August.

CHAPTER XI.

HARDY FRUIT.

The next work must be the planting of the fruit border, which should be done as soon as possible, provided that the weather is not frosty. Apples, pears, and plums are the most suitable fruits to plant, and a few young trees of the best varieties should be purchased from a reputable nurseryman. Apples should be on the "Paradise" stock, and pears on the "Quince." This was fully explained when the subject of grafting was dealt with on p. 52.

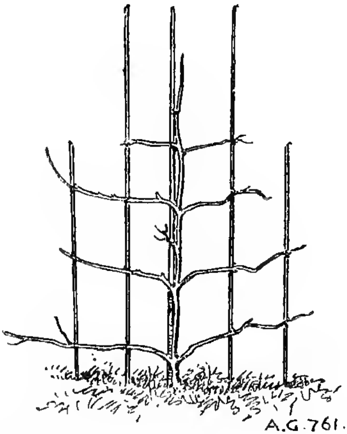

Fig. 41.—An Espalier Trained Pear, Doyenné du Comice.

The tree is four years old, and grafted on the quince stock.

List of Apples and Pears.—The following table gives a few of the best varieties which provide a succession of fruit both for culinary and dessert purposes:

APPLES.	Period of Use.
Varieties for Cooking.	
Lord Grosvenor	July and August.
Stirling Castle	August to November.
Bismarck (a wonderful cropper)	November to February.
Lane's Prince Albert	January to March.
Wellington (or Dumelow's Seedling)	February to May.
Bramley's Seedling	February to May.
New Northern Greening	May and June.
Varieties for Eating as Dessert.	
Beauty of Bath	July and August.
Worcester Pearmain	September and October.
Cox's Orange Pippin (the best)	October to November.
Duke of Devonshire	February to May.
Sturmer Pippin (travels well)	May and June.
Brownlee's Russet	Keeps till Spring.
Court Pendu-Plat (blooms late)	February to April.
PEARS.	
Dessert Varieties.	
Jargonelle	August.
Williams' Bon Chretien	September.
Louise Bonne de Jersey	October.
Beurré Superfin	Late Oct.—Early Nov.
Pitmaston Duchess (very large)	October and November.
Emile d'Heyst and Conference	November.
Doyenné du Comice (excellent)	November and December.
Culinary Varieties.	
Brown Beurré	October and November.
Catillac	Keeps till May.
(A Pear ugly in appearance but excellent in	quality.)

Plums.—The following varieties of plum are all good: Victoria, River's Early Prolific (small, but very early), Czar, Monarch, Pond's Seedling (large), Coe's Golden Drop, and Early Transparent Gage.

Planting.—The best type of tree to plant is the bush. Holes should be dug ready to receive the trees when they arrive. Old mortar rubbish forked in the bottom of each hole is beneficial. When the trees are received the roots should be examined, and all jagged ends cut off clean. If they are dry, they should be soaked for twenty-four hours. The holes should next be arranged so that the level of the soil will cover the point of grafting when the tree is planted. Before the tree is planted the bottom of the hole should be trodden firm. The tree is next placed in position, the roots horizontal. (Fig. 42.) The ground round the tree is then made firm, and the tree securely staked, after which a layer of loose straw manure should be placed round the tree. (Fig. 43.)

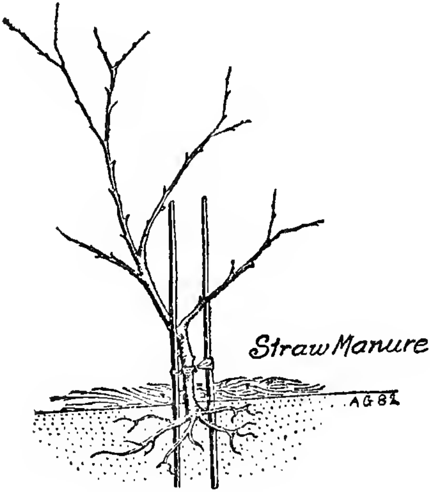

Fig. 42.—How to Plant a Fruit Tree.

Apple trees should be in a majority, and the border might be planted in the following way, the trees being from 8ft. to 10ft. apart, thus: Apple, pear, apple, plum, apple, pear, apple, plum, etc.

Bush Fruits.—Other fruits necessary are black, red, and white currants, gooseberries, raspberries, and strawberries; and, if space can be found, that most useful "fruit," rhubarb. In stocking a new garden it would be preferable to raise currant and gooseberry bushes from cuttings. This operation will be explained later. Raspberry canes should be planted in rows about a yard apart, the plants being placed from 12in. to 18in. asunder in the rows. When planted the canes must be cut down to about 6in. of the base to ensure a vigorous growth of new shoots. Red Antwerp and Superlative are good varieties to plant. When the plantation is established, the old canes are cut out early in winter, and the new ones "topped" of the weak ends. If the bed becomes too crowded the superfluous canes must be thinned out and put into fresh rows as required. The autumn-fruiting raspberry is worthy of note, though it is little grown. It should be severely pruned, as this plant bears on the current year's growth.

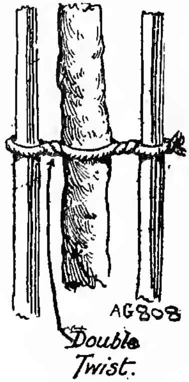

Fig. 43.—Mode of Staking a Fruit Tree.

Strawberries.—Strawberry runners should be planted in rows about 2½ft. to 3ft. apart, the plants being at intervals of about 18in. in the row. (See Fig. 44). In early winter the bed might be covered with loose "green" stable manure. Very little of this, except straw, will be left on the surface in the following spring, and this will serve to keep the fruit clean. It is most important that runners should be kept in check, only those required for increasing the plantation being allowed to grow. An excellent method is to root each runner in a small pot, severing it from the parent plant when the youngster is firmly rooted. (See Fig. 45.) Good results will be obtained if the plants are not kept longer than three years. Fresh plantations should be formed each year on new ground, at the same time "grubbing" out the oldest part of the bed, and planting with some other crop. Good varie-

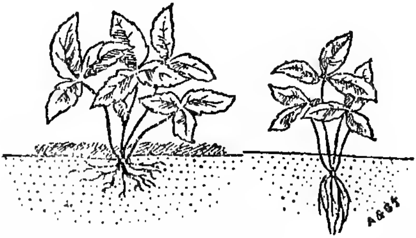

Fig. 44.—Right and Wrong Way of Planting Strawberries.

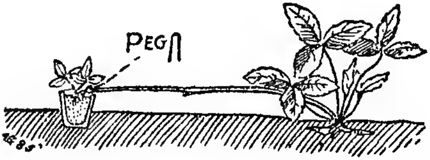

Fig. 45.—Method of Layering Strawberries.

ties to grow are Royal Sovereign, The Laxton, and British Queen.

Rhubarb.—A few crowns of rhubarb should be planted in a bed about 4ft. apart each way. When these have developed they may be divided. When the bed is sufficiently large a few crowns might be forced each spring by placing drain pipes or cheese boxes over the crowns, and covering with straw litter. It is surprising what a difference in the earliness of the shoots even a covering of litter through the winter makes. Of course, the rhubarb does not come within the definition of fruit; it is really a vegetable; but, as its leaf-stalks are used for a similar purpose to cooked fruit, we have included it in this section.

CHAPTER XII.

PRUNING.

Skill in this important and interesting operation can only be attained after much practice and careful observation, as fruit trees, like human beings, have their own peculiarities and habits.

What is Pruning?—It is not just the cutting back in winter, anywhere and anyhow, of the young shoots, as seems to be the practice of many jobbing "gardeners." It has many objects, which may be summarised thus:

(1) Encouragement and regulation of growth.
(2) Shaping and training of trees.
(3) Removal of out-of-place branches.
(4) Admittance of sunlight between the branches.
(5) The increase of fruitfulness.

Fruit Trees.—In the first place, fruit trees have varying habits of growth, some being very vigorous and producing an enormous quantity of new wood each season, whilst the branches of others are weak and thin. The former require little pruning (winter), whilst

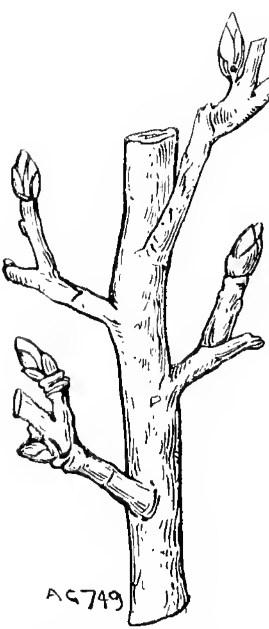

Fig. 46.—Fruit Spurs on a Cordon Pear.

These have developed as the result of skilful Summer pruning.

the latter may be cut back hard, as this encourages growth. A tree may be grown any desired shape, if properly pruned, only those leaders being retained which are growing in the required position. Cuts for extension of growth are made near an outside wood-bud (for distinction between "wood" and "fruit" buds, see sketch). This is known as winter pruning, and should only be carried out when there is no fear of frost.

In summer much good work can be done towards shaping a tree, when branches which crowd the middle or cross one another may be removed. It must be remembered that the leaves are the manufacturers of most of the food, and they must have fair play and not be crowded. If it is necessary to remove a large branch, the saw cut should be first made underneath, finishing off on top, so that the bark may not be torn away by the falling branch. The cut should afterwards be pared with a sharp knife, and smeared with clay or grafting-wax. A " snag " should never be left.

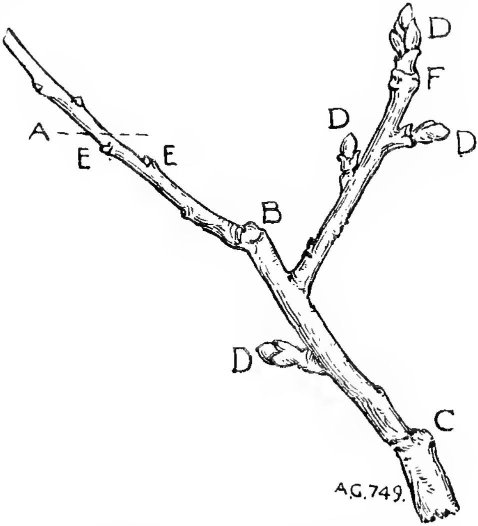

Fig. 47.—Branch of Apple Tree.

A. Point of Winter pruning. B. Last year's pruning. B, C. A year's growth. D, D. Flower buds. E, E. Wood buds. F. Last year's Summer pruning.

In July all lateral shoots, except those required for leaders, should be shortened back to four or five buds from the base; and, if any later growth takes place, this should be nipped back to one leaf. The sap will thus be diverted to the lower buds, which will develop into fruiting-spurs. The ideal to aim at is to get every branch spurred from the bottom to the base of one-year-old wood, and if a tree is taken in hand when young this is easily attainable, as is the production of any desired shape.

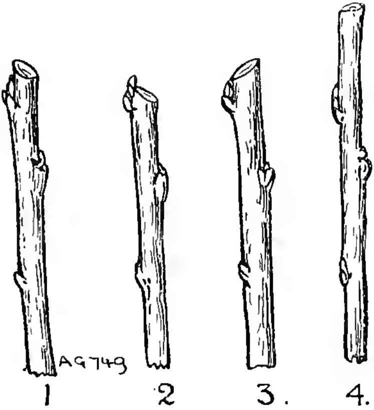

Fig. 48.—Good and Bad Pruning.

1. Proper cut. 2. Cut too near the bud. 3. Cut in wrong direction. 4. A "snag" left.

Thus, if summer pruning is properly carried out, very little winter work is necessary.

Newly-planted trees should not be pruned before March.

Red (and white) currants and gooseberries are included in the preceding remarks.

Black currants, which fruit on new wood, require little pruning except the removal of old shoots.

Plum trees, when well established, only need occasional thinning of misplaced branches to admit light to centre. (See Figs. 46, 47, 48, and 49.)

Root Pruning.—Sometimes a tree produces a great quantity of wood and very little fruit. In this case, shortening the branches will only make matters worse. Root-pruning in November is the remedy. If the tree is young it may be lifted, the large roots cut back, and replanted. With established trees, however, a trench should be dug at a point under the most spreading branches, and the " large " roots cut through. If one side is done it will probably be sufficient, though if not so the other side can be pruned the following year. (See Figs. 50 and 51.)

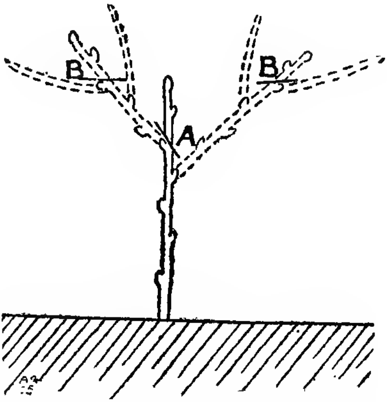

Fig. 49.—Pruning Fruit Trees.

A. First year's pruning. B, B. Second ditto.

Roses.—This will vary according to the variety, habit of growth, and object of grower. If the desire is to produce a few good blooms for exhibition purposes, the pruning should be severe; whilst if a profusion of moderate blossoms is desired, less severity must be practised. Weak-growing roses—in which class are many hybrid perpetuals—should be pruned much more severely than plants of stronger habit, like many of

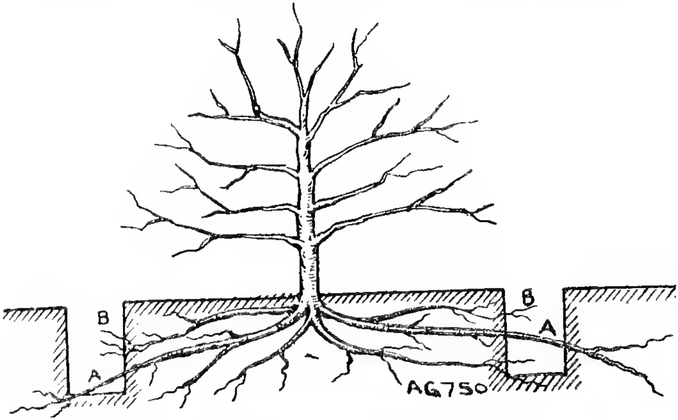

Fig. 50.—Root Pruning.

A. Thick roots to be shortened. B. Fibrous ones to be left.

the hybrid teas. It is advisable to leave the pruning of roses till the beginning of April.

Common sense alone must be the guide in pruning,

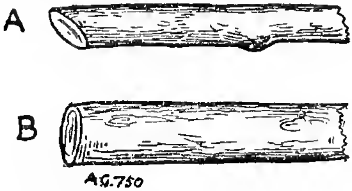

Fig. 51.—Pruning the Roots.

A. Right way. B. The wrong one.

remembering that a shoot must be pruned at an outward-growing bud, and that a very sharp knife is essential.

CHAPTER XIII.

INSECT AND FUNGOID PESTS.

It is advisable, in all gardening classes, to give a series of lessons on economic entomology, so that the budding gardeners may be able to discriminate between what to destroy and what to leave alone. There is a great tendency, even among experienced gardeners, to kill everything in the nature of an insect. One often hears the term caterpillar's eggs applied to the small cocoons of the ichneumon fly found on caterpillars. We propose, therefore, to deal with a few friends as well as pests.

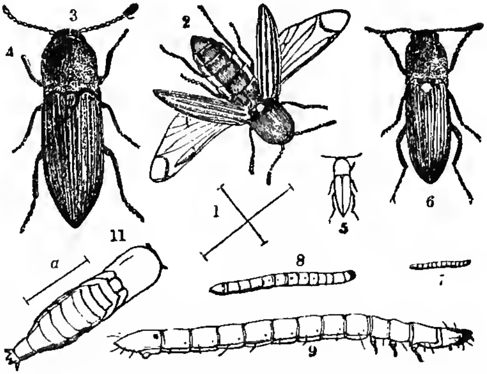

Fig. 52.—Wireworms and their Parents (Click Beetles).

Wireworms.—By far the worst depredator in the garden is the wireworm, which is the larva of the click beetle or skip jack, an innocent-looking insect which, if laid on its back, jumps into the air in its endeavours to right itself, at the same time making a "clicking" sound. Hence its name. The "worm" is yellow in colour, and varies from ½in. to 1in. in length, according to age. It has a very shiny appearance, and has three pairs of legs only, one pair on each of the first three segments of the body. Its peculiar harmfulness is due to the fact that it is not fastidious in its tastes. Hardly any plant is immune from its attack. It does not stay at one plant, but eats at the vital parts of the root, and then transfers its affections to another. Again, the larval stage of its career occupies from three to five years, whereas most larvæ are content with a single season's feastings. (See Fig. 52.)

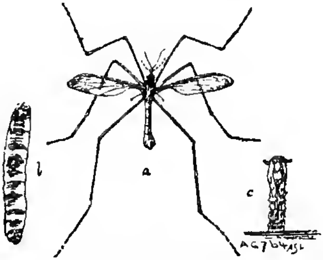

Fig. 53.—Daddy-Long-Legs.

A. Is the fly. B. The larva (Leather Jacket Grub.) C. Pupa or chrysalis.

If the soil is carefully dug, many of these creatures will probably be found. They should be given little opportunity for further mischief. Trapping both larvæ and beetles may be resorted to. For the former, pieces of beetroot or potato should be placed under the surface of the ground, and examined every few days. The baits will probably have attracted a number of wireworms, which must be collected and destroyed.

For the beetle small heaps of clover or similar plants should be covered with boards. These form convenient egg-laying nooks, which should be burned at intervals of about a week. In small gardens, chemicals such as carbon bi-sulphide may be inserted in small holes in the ground. They give off poisonous gases, which permeate the soil and destroy the grubs.

Leather-jacket Grub.—This is the larva of the Daddy-long-legs fly. It is about an inch long, dark in colour, and has no legs. It lives in the soil, and comes to the surface at night and gnaws through the stems of young cabbage and lettuce, causing them to wither and die. Owing to its feeding by night, and having a tough, leathery skin, it is difficult to kill. If a plant is found bitten through in the morning, search the soil around, and the grub will probably be found. (See Fig. 53.)

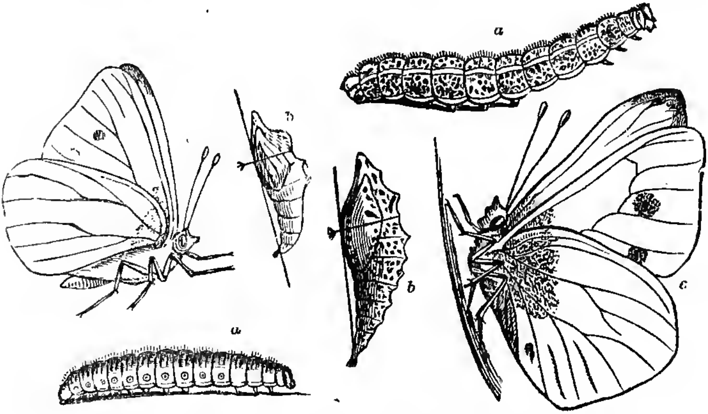

Fig. 54.—Small and Large White Cabbage Butterfly.
A. Are the caterpillars. B. The pupæ.

Cabbage White Butterfly (Large and Small). —This is one of the most obnoxious of garden pests. The butterflies in spring and early summer deposit their eggs on plants of the cabbage tribe. Very soon a veritable army of caterpillars is at work eating up the tenderest parts of the plants. Hand-picking every day is the surest remedy for this pest, whilst children should be encouraged to wage war on all white butterflies. If concerted action were taken a good deal of good would be done. (See Fig. 54.)

Millepedes.—These creatures are about half an inch in length, slender, and about as thick as a pin. They have two pairs of legs on each joint of the body. They are especially found in heaps of decaying vegetable matter, and their food consists of growing and decaying plants. To sprinkle lime on the ground and dig it in is a good practice, while soot-water drives them from the neighbourhood of growing plants. Traps and carbon bi-sulphide may be employed, as in the case of the wireworm. (See Fig. 55.)

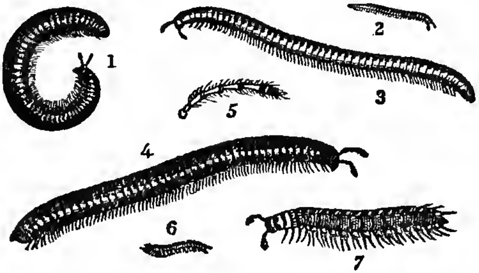

Fig. 55.—Millepedes or False Wireworms.

Greenfly, or Aphis.—This obnoxious pest may be destroyed by syringing the affected plants with a quassia solution or an emulsion of soft soap and paraffin.

Black Aphis or Dolphin Fly.—This attacks the Broad bean, especially in dry summers. If the young tops of the plants are nipped out when the beans are well in bloom, the crop will probably not be attacked. If the plants should be affected, the tops must be cut out and burned, and frequent syringings of soft soap emulsion given.

Flea Beetles.—These tiny insects attack and devour the young seedlings of cruciferous plants. A good sprinkling of soot upon the plants after a shower or heavy dew will drive them off.

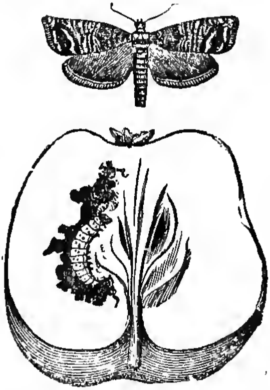

Fig. 56.—Codling Moth and its Caterpillar.

The Winter Moth.—The caterpillars of the moth devour the young leaves of apple trees. The female moth is wingless; and so, to lay her eggs on the branches of the tree, must crawl up the stem. If grease bands are applied to the trees early in October many of these creatures may be caught. The grease may be bought cheaply from seedsmen or nurserymen. Bands of grease-proof paper are tied firmly round the stems of the trees, and the grease applied with a brush. The bands must be carefully watched, as the grease becomes dry and requires renewing. The only " cure " for the caterpillars is to spray with some poisonous solution, such as Paris green (one ounce to twelve gallons soft water) before the blossoms open.

Codling Moth.—This is a tiny moth which appears about the end of May, and deposits its eggs singly in the crowns of the small apples. When the caterpillars hatch out they eat into the fruits and feed there. When they are fully grown they eat into the apple, so that it falls to the ground ("windfalls" are often caused in this manner). The caterpillars then crawl out and pupate in the ground, where they remain till the following spring. The trees should be sprayed with Paris green solution as soon as the fruit have set. All windfalls should be gathered as soon as they drop. Winter spraying with caustic alkali solution does much good, as it cleans the bark, and so deprives insects of wintering quarters. (See Fig. 56.)

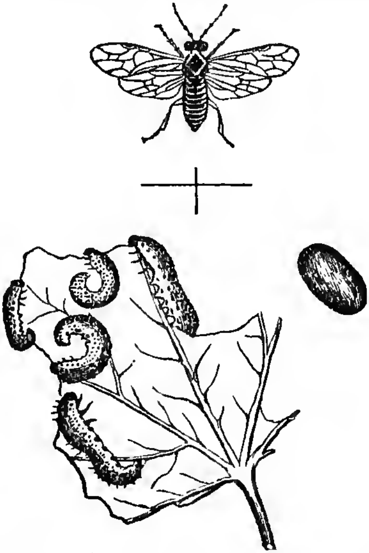

Fig. 57.—Currant Sawfly and Larvæ.

Woolly Aphis.—This aphis attacks apple trees. It is easily distinguished by the white "fluff" which it exudes. A good preventive is to scrub the affected parts with an old tooth-brush dipped in methylated spirit.

Magpie Moth.—The caterpillars of this moth are greyish in colour, marked with black and yellow. They attack gooseberry and currant trees, and quickly destroy the leaves. Hand-picking is a sure remedy in small gardens. The ground should be sprinkled with quicklime and deeply dug in early winter. Spraying with caustic alkali solution destroys caterpillars hibernating on the trees.

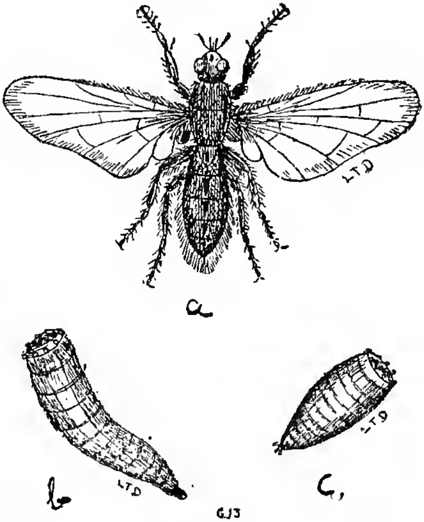

Fig. 58.—Onion Fly and its Larva (Magnified).

Gooseberry and Currant Sawfly.—The larvæ of this insect are often mistaken for the caterpillars of the Magpie Moth, owing to the similarity of marking. They do not, however, attack the plants until the leaves are fully grown. Hand picking is the best remedy for small gardens. (Fig. 57.)

Wood Leopard Moth.—The caterpillars of this moth often damage fruit trees. On February 11th, 1913, whilst a class was pruning, one of the boys noticed a brown excretion on the trunk of an apple tree. On removing this, a hole quite a quarter of an inch in diameter was disclosed. A piece of flexible wire was obtained and, after a hook had been made at the end, this was pushed into the hole for about six inches. The "catch" consisted of a caterpillar about 2in. long, of a yellow colour, with small black spots. The moth, which is of a greyish colour, lays its eggs in summer on the bark of trees, and the caterpillars, on hatching, eat their way into the trunk. Birds like Tits must eat an enormous number of these and similar eggs, whilst the woodpecker, no doubt, destroys many caterpillars.

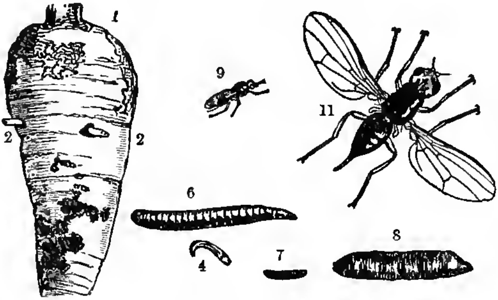

Fig. 59.—Carrot Fly, Larva and Pupa.

The Fly Pests (Onion, Carrot, Celery, and Cabbage Root Flies).—These flies are easily mistaken for the common housefly. They lay their eggs in the stems or leaves, the larvæ feed on the growing plants, and pupate in the ground.

Onion Fly.—The presence of this fly is denoted by the leaves turning yellow and then drooping. All affected plants should be pulled up and burned. If the ground is well dug and manured, and the seed sown thinly, the crop will have a chance to outgrow the evil effects of the pest. An extra precaution can be taken by sowing in the drills, along with the seed, fine sand soaked in paraffin. The plants may also be syringed occasionally with the following insecticide: Paraffin, 1 wineglassful; soft soap, 1oz. to 1gall. soft water. Autumn-sown onions are practically immune from the attacks of this pest. (Fig. 58.)

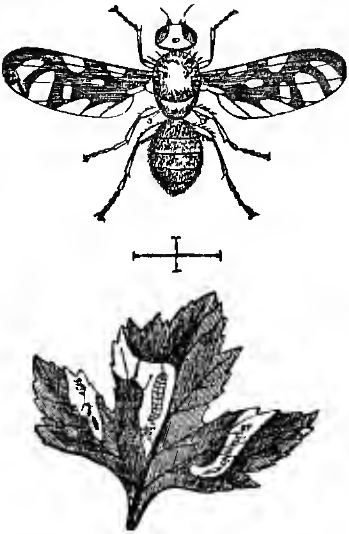

Fig. 60.—Celery Fly and Larvæ Feeding in the Leaf.

Carrot Fly.—The leaves of affected plants turn yellow and wither, whilst an examination of the root will reveal the presence of maggots, which throw out a reddish-yellow excrement known as "carrot rust." Seed should be sown thinly along with wood ashes, and the young plants thinned early and dusted with soot. (Fig. 59.)

Celery Fly.—The eggs of this fly are layed in the leaves of the young plant between the two skins, and the maggots tunnel their way along. They are easily seen, and should be pinched between the thumb and finger. Syringing with the soft soap and paraffin emulsion, and copious waterings in dry weather will enable the plant to make healthy growth, and so withstand the attacks of the pest. (Fig. 60.)

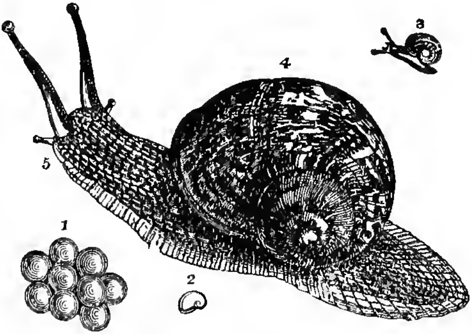

Fig. 61.—Common Garden Snail and its Eggs.

Cabbage Root Fly is one of the most insidious of garden pests, being specially fond of attacking early cauliflowers. The plants when about half-grown will suddenly wither and die. On examination of the roots, numerous maggots will be found. There does not seem to be any absolute prevention from attack, though we have found the liberal application of soot to the ground about to be planted, and frequent waterings with the soft soap and paraffin emulsion are great helps. An occasional application of nitrate of soda will promote vigorous growth, and so help the plants to overcome the effects of the pest.

Ants.—Though not themselves injurious to plant life, these insects often denote the presence of greenfly, on the excretion of which they feed. Boiling water poured into the nest will destroy thousands, whilst dressings of soot and syringing with soft soap emulsion will drive them away.

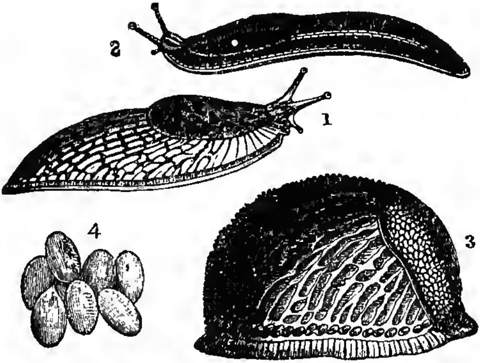

Fig. 62.—GARDEN SLUGS.

1. Milky slug. 2. Black slug. 3. Same when at rest. 4. Eggs.

Woodlice.—Though not technically insects, these are one of the most troublesome of pests, as they devour tiny seedlings and tender shoots. Powdered borax sprinkled around plants will keep them away, and they may be trapped in small plant pots filled with hay, which should be examined frequently, and all woodlice found, destroyed.

Earwigs cause much havoc by eating young shoots. They may be trapped by placing plant pots filled with hay, or half-closed match boxes, amongst the plants affected.

Slugs and Snails.—Words cannot describe the disappointment caused by the depredations of these horrid creatures. Almost all succulent plants are attacked by them. It is very important that rubbish should not be left about the garden to provide shelter for them. They may be caught by hand and dropped into a jar of strong salt solution, at night or after rain, when they are moving about. They do not like dust or grit, and so soot sprinkled about plants will serve to keep them off, as will also borax. A saucer of beer will serve as a splendid attraction to them, and many good hauls may be made by placing one down and frequently visiting it. (Figs. 61 and 62.)

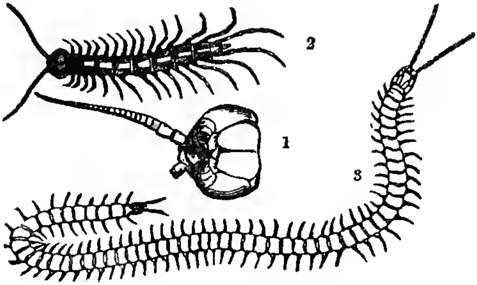

Fig. 63.—Garden Friends—Centipedes.

Winter Washing of Fruit Trees.—If the branches of fruit trees are neglected and become covered with moss and lichen they harbour all sorts of insect pests. The bark should therefore be kept clean. A wash of caustic alkali solution sprayed on the trees during winter will destroy all vegetable growths on the branches, and at the same time many loose pieces of bark, which form suitable resting places for insects, will be removed. The bark of "washed" trees has a smooth, shiny appearance, and little trouble will be experienced in keeping in check the innumerable pests which attack the orchard.

The wash is made by dissolving separately in water 1lb. of caustic soda and 1lb. pearlash. When dissolved, the solutions are mixed, and about a pound of soft soap is added and stirred in. Sufficient water to make ten gallons is then added. The soft soap causes the wash to stick to the branches. The end of February is the best time to spray the trees, and it is needless to say that a still day must be chosen and old clothes worn.

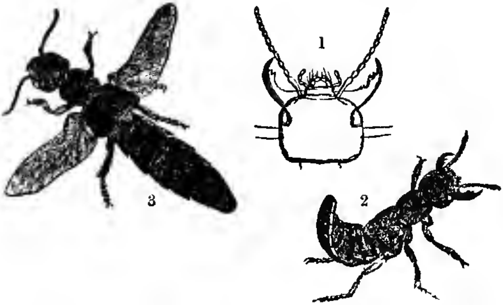

Fig. 64.—A Garden Friend—Devil's Coach Horse Beetle.

Insect Friends.—All carnivorous insects must be preserved, as they feed on insects which are harmful. The centipede, for instance, feeds on millipedes, woodlice, slugs, and a great variety of vegetarian pests. The grubs of the ladybird find their source of food in the greenfly or aphis, whilst the ichneumon fly deposits its eggs inside caterpillars. The grubs which hatch from these eggs feed on the growing foster parent, and when about to pupate attack its vital parts. The caterpillar then crawls to some shelter, and the grubs of the fly emerge and spin tiny yellow cocoons, which on no account should be destroyed. Many beetles, especially the Devil's Coach Horse, are also useful insects. So, too are the Hawk and the beautiful Lace-wing Flies. Toads and frogs also feed on worms, etc. (See Figs. 63, 64, 65, 66, and 67.)

Then, again, thrushes feed on snails; starlings on worms; and the chaffinch and greenfinch on weeds, seeds, and caterpillars and thus prove themselves real friends of the gardener.

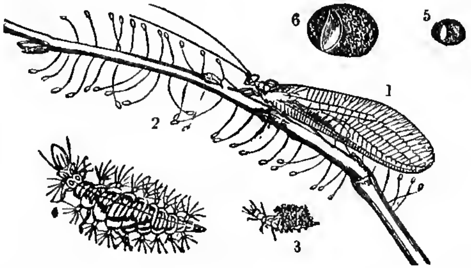

Fig. 65.—Lace-wing Fly and its Larva. A Garden Friend.

The narrow lines with tiny knobs on the ends are the eggs. Below is the larva with its bristly body. Latter eats greenflies.

Fungoid Pests. (Potato Disease).—This blight is caused by a fungus, which permeates through the whole of the plant. It is especially prevalent in a wet season, as the spores need moisture in order that they can infect a plant. "Clean" sets should be planted, and all refuse of diseased potatoes burned. The introduction of fresh seed adds vigour to the crop, and if the rows are well earthed up there is less likelihood of the tubers being damaged. Spraying the plants with Bordeaux mixture is beneficial, especially to the latter varieties, as the disease does not attack the plants much before the end of July. Bordeaux mixture may be made as follows: Copper sulphate (nearly 1lb.), washing soda (1½lb.), are dissolved in 10 gallons of water.

Finger and Toe or Club Root.—This fungus attacks turnips and cabbages, causing the roots to become distorted. The affected roots should not be left on the ground to rot, but be burned and the ground dressed with some poisonous substance, such as gas-lime.

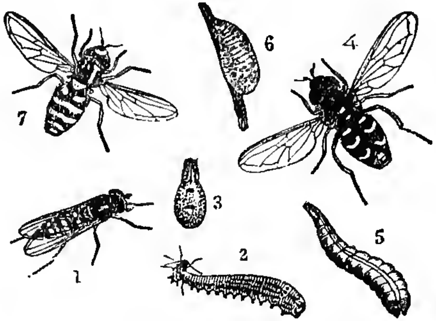

Fig. 66.—Hawk Flies and their Larvæ. Garden Friends.

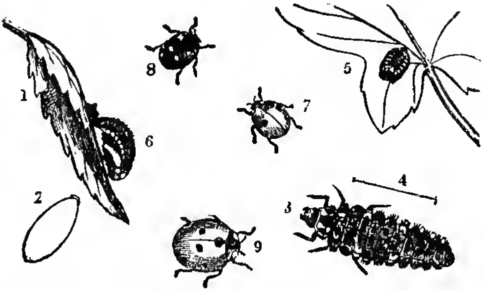

Fig. 67.—Ladybird Beetles and their Larvæ. Garden Friends.

CHAPTER XIV.

WORK FOR THE MONTHS.

January.—Clearing of plots and finishing of digging and manuring, "weather permitting." Basic slag or lime may be added to the soil—slag, 4lb. per rod; lime, 10 to 12lb. per rod. Potato sets should be kept in the light to sprout. They must be free from frost. If the weather is not frosty fruit trees may be pruned, whilst scions for grafting may be cut.

February.—Continuation of January work. Broad beans may be planted on dry plots. Fruit trees may be planted any time during the winter if weather is suitable. Spraying of fruit trees with caustic solution towards the end of the month. Rose trees may also be planted.

March.—Weather favourable, this is the month for seed sowing. Early peas, carrots, onions, early potatoes, parsnips, radishes on plots, Brussels sprouts, cabbage, cauliflower, leeks, and lettuce on seed bed. The hotbed should be in full swing this month. Pruning should be completed. Hardy annuals may be sown on flower border.

April.—Sowing of vegetables (see tables). Rose trees should be pruned as soon as possible. The splitting up of perennials and trimming of flower border should be carried out. Grafting of fruit trees. The hoe should be kept in constant use.

May.—Hardening off of plants raised on hotbed. Sowings of vegetables (see tables) also wallflowers and sweet williams (see biennials) should be made. Weeds should be destroyed by constant hoeing.

June.—Sowing and planting out of vegetables (see tables). Hoeing and mulching of short manure will keep moisture in soil. Strawberry layers may be pegged down. Biennials may be sown.

July.—Planting out (see tables of vegetables). Mulch tomatoes with manure. Pinch out side shoots. Sow parsley for winter use. Constantly use hoe. Fruit trees must be summer pruned. Layers may be made. Budding of roses takes place. See that all dead blooms are removed from sweet peas.

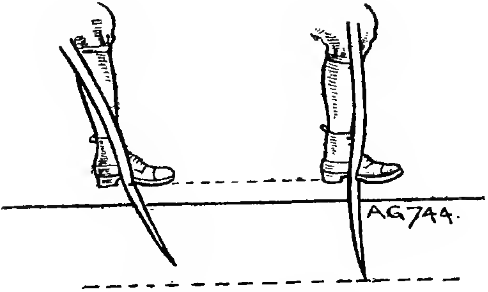

Fig. 68.—Digging.

Left hand sketch shows the wrong way to use a spade—too slanting. Right hand sketch shows the proper way—inserting it vertically.

August.—Sowings of cabbage onion (Giant Rocca) and lettuce (see tables). Sow crops to be used as green manure. Herbs should be cut and dried. Constant hoeing necessary. Old canes of raspberries should be cut out as soon as fruiting is over.

September.—Harvest crops which are ready. Earth up celery and leeks. Cuttings of fruit trees can be made.

October.—The "harvest" month for vegetables. Ground should be dug when cleared

November.—Push on manuring and digging (Fig. 68). Fruit trees may be planted and pruned (old-established trees). Plant roses.

December.—Digging, and pruning fruit trees must be proceeded with if weather is favourable. See that fruit trees are properly staked.

A FINAL NOTE.

It is advisable that every member of a gardening class should have a notebook in which he can keep careful record of the work done, prices and quantities of seeds sown, and value of crops yielded. Cultural notes may also be made from lessons given indoors during inclement weather, and sketching from nature of the various processes will form useful matter to be inserted. A few minutes at the end of each gardening lesson is well spent by each pupil making a few notes about the work he has been doing outside. We find that the boys greatly appreciate the notebook, and have made it a practice to allow them to keep the books when they leave school.

Indoor School Gardening.

GROWING PLANTS IN POTS.

So far the information given in this volume has applied solely to gardening in the open air, where the needful space for cultivation can be easily obtained. There are, however, hundreds of schools in towns and suburbs where the necessary land for outdoor gardening cannot be obtained, and the only way in this case to teach the art is by cultivating plants in pots, etc., in the schools. And yet another method, which applies mainly to Sunday schools, is to encourage the scholars to grow the plants at home, the seeds, bulbs, or plants being supplied to them, and prizes eventually given to the best grown specimens.

We have therefore come to the conclusion that to make this volume an all-round guide to school gardening, it is essential that we add a special chapter describing the culture of annuals, bulbs, and plants in pots, either in the school under the supervision of the teachers, or in the home under the oversight of the parents. Those grown in the school would, of course, be mainly for educational purposes, and those cultivated in the home for the ultimate purpose of their being exhibited for prizes at a children's show. There are many excellent children's flower shows held annually in the Metropolis, and in our large towns and cities, as Sheffield, for example. We remember, in years past, adjudicating at an exhibition of bulbs, numbering many thousands of specimens, at Sheffield, as well as one of plants grown in pots and shown at the People's Palace in the East of London, and all showed what a keen and enthusiastic interest was taken in the plants by the youthful gardeners. To assist others, then, to follow such commendable examples, we shall now proceed to give a few plain hints how to grow plants, etc., with success.

I.—HARDY ANNUALS.

Hardy annuals are comparatively inexpensive, and easy plants to grow. They can be purchased in penny packets, and one packet of each kind will suffice to sow several pots.

Varieties to Grow.—Dwarf nasturtiums, godetias, candytuft, Virginian stock, pot or meteor marigold, clarkias, eschscholtzias, love-in-a-mist, love-lies-bleeding, sweet alyssum, Viscaria cardinalis, and Chrysanthemum tricolor, are all attractive and easily-grown kinds. Even the sweet pea and the mignonette may also be grown with fair success, although not quite so easily as those previously named. Of course, there are many other kinds, but we have confined the selection to those that may be grown by children of all ages.

Pots.—The most suitable size of pot in which to grow the plants is that known as a "five-inch." If new, they should be soaked in water for a few hours and then stood aside to dry. If old ones, and they are dirty, scrub them clean in hot water, and place them aside to dry. Some drainage materials will also be required. These may consist of old pots broken into small pieces ("potsherds"); or small pieces of coke, broken bricks, or pebbles. In each pot, when ready, place a piece of material over the drainage hole, then a layer of smaller portions, and a final layer of small ones, the whole to equal about an inch in depth. Over this place a few decayed tree leaves, or rough fibre from the compost, or, failing these, a piece of brown paper, to prevent the compost mixing with the drainage.

Compost.—This should be purchased ready mixed from a florist. The cost would be about one shilling per bushel. It should consist of two parts of good soil, one part of leaf-mould or well-decomposed manure, and one part of silver sand. Half a pint of bone-meal added to each bushel of compost would improve the fertility of the whole.

Filling the Pots.—Fill the pots gradually with the compost, pressing it down moderately firm. Leave a space of an inch from the top of the pot, and make the surface even, by pressing it slightly with the bottom of another pot. Now moisten the soil thoroughly with tepid water applied by means of a fine-rosed water-pot. Let the moisture drain from the surface, and then sowing may be carried out.

Sowing the Seed.—The proper time to sow is early in April. Large seeds like those of the nasturtium and sweet pea place two inches apart on the surface of the soil; smaller ones distribute about half an inch apart. Bear in mind that it is unwise to sow too thickly, as when the seedlings appear they would be too crowded, and would not develop into good specimens. When the seeds are sown, cover them with sufficient compost to just hide them from view, gently press the surface of the soil with the bottom of a pot, and again gently moisten with tepid water. Write the name of each kind on a wooden label and fix this in the pot. Cover each pot with a sheet of brown paper to exclude light, and then stand the pot close to a shady window until the seeds sprout, when remove the paper and transfer the pot to a sunny window.

Watering.—As soon as the seeds sprout water must be carefully given. Whenever the surface looks slightly dry this will be a sign to supply water. The best way to give moisture to plants in pots is to fill a pail half-full with tepid water, then immerse the pot for ten minutes. This plan not only keeps the pot moist, but also ensures the soil being equally so. When the plants are an inch or so high, gently rap the sides of the pots with the knuckles, or with a stick, every day. If the sound be clear, the plant needs water; if dull and heavy, none is required.

Staking.—When the seedlings are about two inches high they will require supporting, otherwise the stems would fall over. Get some thin bamboo canes, or painted flower sticks about a foot long, and put four around the inner edge of the pots. Then get some fine twine or worsted, and, beginning about an inch from the pot, wind this around the sticks. Loop it securely at each stick. As the plants increase in height add further portions of twine. Sweet peas should have a stake to each shoot, because of their tall growth. Should the seedlings appear to be too crowded, pull out the weakest to give the stronger ones more room.

Feeding.—As soon as the seedlings are three inches high add a teaspoonful of Clay's Fertiliser to each pail of water used for moistening the soil; this will encourage the plants to grow more freely, and eventually to produce plenty of flowers.

Cleansing the Foliage, etc.—The plants will naturally get their foliage covered with dust, and as this would seal up the breathing pores and prevent the plants making healthy growth, the pots should be placed outside for a short time in showery weather for the rains to wash off the dust. The plants should be grown close to a sunny window, and each turned round a little every day, so that all parts are eventually exposed to the sun. During the day, it would, indeed, be an advantage to place the pots on the outside sill after the middle of May, bringing them indoors at night. When the flowers begin to fade pick them off, then the plants will continue to flower for some time.

II.—HALF-HARDY ANNUALS.

These are plants of a tender nature, and which have to be reared from seed sown in heated greenhouses. Seedlings can, however, be readily purchased from florists in May and then planted in pots for flowering from July onwards.

Kinds to Grow.—China asters, ten-week stocks, French and African marigolds, petunias, salpiglossis, lobelia, Phlox Drummondi, and verbenas are kinds that may be easily grown in pots.

Culture.—Five-inch pots prepared as advised for hardy annuals are suitable for growing above plants. The compost should consist of equal proportions of loam, well-decayed manure, and silver sand. Four asters, or four Phlox Drummondi, or three stocks, three marigolds, three verbenas, three salpiglossis, one petunia, or five lobelias should be grown in each pot. The petunia plant place exactly in the centre of the pot. In the case of three plants place them at equal distances apart; fours, plant one in the centre and the others equidistant near the edge. Leave a space of half an inch at least between the surface of the soil and the top of the pot, and make the compost fairly firm. After planting moisten thoroughly with tepid water, and place the pot close to a sunny window.

Subsequent culture consists of placing a neat stake to each plant of stock, aster, marigold, petunia, salpiglossis and phlox. The verbenas and lobelias allow to grow naturally. Give water precisely as advised for hardy annuals, and when the plants begin to flower apply liquid manure at each watering. Turn each plant round a little every day, and in showery weather stand the plants outdoors for the rain to cleanse the foliage. In summer the plants may be grown on the outside window sill by day.

III.—BULBS IN POTS, BOWLS, ETC.

There are three interesting methods of growing bulbs, all of which are specially suitable for school children. One is in pots, perhaps the most difficult method; the others in fibre in bowls, or in special glasses containing water, both exceedingly simple plans.

In Pots.—The first requisite is clean 5in. pots; some drainage materials similar to those advised for hardy annuals; and some good compost—two parts of good loamy soil and one part each of thoroughly decomposed manure, leaf-mould, and silver sand, with a pint of bone-meal to every bushel of the mixture.

The next consideration is the kind of bulbs to grow. The most popular one is the hyacinth, next the tulip, the daffodil, crocus, scilla, and snowdrop. For school exhibitions the hyacinth takes the lead because it is not only easier to grow than the others, but also on account of the fact that, as only one bulb can be grown in a pot, the cultural results are more evenly displayed.

Assuming the pots to be cleansed and drained as directed for hardy annuals, fill them two-thirds with compost, pressed down firmly. Now place one hyacinth bulb in the centre, or three of tulips or daffodils, at equal distances apart; or crocuses, scillas, or snowdrops, practically close together, and add sufficient compost to cover the three former nearly to their tips, and in the case of the others to completely cover them, and press it down firmly.

The next step is to remove the pots to a dark cellar or outhouse, or to the base of a shady wall, and there to cover them with about six inches of cinder ashes or cocoanut-fibre refuse. Assuming the potting to be done in October, the bulbs should remain covered until

January, by which time they will have become well rooted, and then may be uncovered and removed to a semi-light position for a week. After that period has elapsed, remove the pots to a light window and commence to give water.

Whenever water is applied, supply it by immersing the pot in tepid water for ten minutes. Turn the plant round a little each way daily to prevent the flower spike being drawn to one side. It is well also to affix a neat stake to each bulb, and to secure the spike or flower stem to this. For hyacinths a stout piece of wire, with one end thrust into the bulb, is a neat and effective support.

When the bulbs begin to develop their flowers give a little weak liquid manure once a week. If the flowers are likely to get too advanced before the show, stand the pots near a shady window; if too backward, place them close to a sunny one. As a rule bulbs that have once flowered in pots will not do so a second time, so, after flowering, they should be planted in the garden.

In Fibre.—Fibre is a compost consisting of two parts of cocoanut-fibre refuse and one part each of fine sea-shell and charcoal. It is best purchased ready prepared from a bulb dealer's, as the ingredients are not easily obtained in a small way. The mixture is much cleaner to handle than soil, and bulbs do just as well, if not better, in it. Special bowls or jars are sold by bulb dealers, but ordinary pots, or even jam jars, will answer the purpose just as well, as a drainage hole in the bottom is not essential.

Having the bowls or pots ready, place two or three lumps of charcoal in the bottom, then fill them to within an inch of their rims with compost, which press down moderately firm. One bulb of hyacinth or three of tulips or daffodils, will suffice for a bowl five inches in diameter; three of the former or five of the two latter for a bowl six inches in diameter. Press the bulbs down into the fibre so that their points just show through, and make the surface firm. Smaller bulbs like crocuses, snowdrops, and scillas plant an inch apart. See that the fibre is moist before placing it in the bowls; if it is not, then sprinkle thoroughly with water. If the fibre be dry when placed in the bowls it will be practically impossible to get it properly moistened afterwards, and the bulbs will not, as a consequence, root properly.

When the bulbs are planted place the bowls in a dark cellar or outhouse, or anywhere where it is cool and light can be excluded. No water must be given. Leave them there until new growth is an inch long, then remove to a semi-light position for a few days and supply water if the fibre appears in need of moisture. Later place the bowls on a table or inner sill of a light window to continue their growth. Use tepid water only for moistening the fibre, and apply strong supports made of stout wire to each flower stem. Insert one end of the wire in the bulb and secure the flower stem to the upper part. Nothing more remains but to patiently await the development of the flowers, and when these have faded to plant the bulbs in the garden.

In Water.—The simplest of all ways of growing bulbs. All that is needed is a special kind of glass with a cup-like top. These can be obtained made of clear, or blue, purple, or amber-tinted shades of colour, from any glass dealers or bulb merchants. Simply place a lump or two of charcoal in each glass, then fill up with rain water to the base of the cup which forms the top of the glass. Place a bulb in the cup, and if the water should touch its base pour a little away, as it is important that the water should not quite touch the base of the bulb.

When the bulbs are placed in position, remove the glasses to a dark cupboard or other cool place, and let them remain until the bulbs have formed plenty of roots, when remove them to a semi-light position for a few days, and afterwards place them close to a sunny window. Support the flower stems as advised in the preceding paragraphs and replenish the water supply from time to time. There is no necessity to change the water, only to replenish any that may have evaporated.

Another plan is to put a good layer of small pebbles in the bottom of a basin and add rain water to nearly, but not quite, cover them. On the pebbles place bulbs of the Chinese Sacred Lily, or any other variety or narcissus, pack a few pebbles between to keep them steady, and then place the basins or bowls in a dark place until plenty of roots have formed. When the latter occurs remove to a light position in the room, and occasionally add more water to take the place of that evaporated.

In Moss.—Collect some fresh moss from a damp hedge bank, shape it into a small ball by means of twine, then arrange bulbs of hyacinths, tulips, narcissus, or crocuses around it, surrounding them with moss secured by twine. Run a stout piece of wire through the centre to act as a support, then dip the ball in water and hang it in a dark cellar till January, when again dip in water and suspend in a window. Afterwards, until the flowers appear, dip the ball in water once a week. This is a very novel way of growing bulbs.

IV.—FLOWERING PLANTS.

Suitable flowering plants, apart from annuals and bulbs, for culture in schoolrooms, or by children in their homes for exhibition, are: Geraniums, ivy-leaved pelargoniums, calceolarias, fuchsias, marguerites, vallota (Scarboro' Lily), musk, petunias, creeping jenny, Campanula isophylla and its variety alba, also heliotropes. All flower during the summer. In winter Chinese primulas and Persian cyclamen, and in spring the calla lily and the genista are plants capable of being grown with fair success.

Geraniums.—These should be cuttings rooted the previous autumn and supplied to the children in April. Each ought to be planted in a 5in. pot in a compost of two parts good loam, one part of well-decayed manure, and one part of silver sand. Grow them near a sunny window, and nip off the points of the shoots early in May. See that the soil is kept moist. Immerse the pots twice weekly in tepid water for ten minutes. When flowers begin to form, sprinkle half a teaspoonful of Clay's Fertiliser over the soil in each pot directly after watering. Do this once a fortnight. In autumn and winter give water once a month only. In February prune the shoots back to an inch from their base; in March repot, and then grow on as before.

Ivy-leaved Pelargoniums.—These require similar treatment to geraniums. Sorts, the shoots of which are inclined to droop, should have their pots placed in wire baskets, surrounding the pots with moss, and then be suspended in a sunny window. Those that are inclined to grow upright train the shoots to stakes.

Calceolarias.—Purchase rooted cuttings early in April, and plant them in 5in. pots in a compost similar to that advised for geraniums. Stand the plants near a partially shaded window, and keep the soil moist by immersing the pots in water twice a week. Sprinkle a quarter spoonful of Clay's Fertiliser on the soil when flowers first begin to form, and again a month later. Throw away the plants after they have ceased flowering.

Fuchsias.—Procure young plants in April, and place them in 5in. pots. Compost, two parts good loamy soil, and one part each of decayed manure, leaf-mould, and silver sand. Grow the plants in a partially shaded window. Give water by immersing the pots once a week until June, then twice a week. In autumn and winter withhold water. Nip off the points of the young shoots in May. In showery weather stand the plants outdoors for the rain to wash and fresh the leaves. If any greenflies appear on the shoots, sponge the latter with soapy water. From June to August sprinkle half a teaspoonful of Clay's Fertilizer on the soil once a fortnight after watering. In winter store plants in a dark, cool place; in February, prune the shoots to an inch from their base; in March repot, and then start to grow as before.

Marguerites.—Buy young plants early in May, place in 5in. pots in the compost advised for geraniums, and stand close to a sunny window. Nip off ends of shoots after potting. Water as recommended for geraniums. In fine weather place on outside window-sill during the day. When flowers appear, sprinkle half a teaspoonful of Clay's Fertilizer on the surface of the soil once a fortnight. After flowering throw away.

Vallota, or Scarborough Lily.—Procure bulbs in August, and plant one in a 5in. pot, in a compost of two parts loam and one of equal proportions of leaf-mould and silver sand. Bury the bulb half-way only in the soil. Place in a shady window till growth begins; then commence to give water, also remove to a sunny position, and keep the soil moist, as growth is most active in autumn and winter. In June stand pot on an outside sunny window-sill, and give very little water. In August the plant will begin to flower, then give water more freely. Only requires repotting every four or five years.

Musk.—Purchase small plants in April, and place them in 5in. pots. Compost, equal parts of good soil, leaf-mould, and silver sand. Grow in partial shade, either on the inner window-sill or in a suspended wire basket. Give water by immersion two to three times weekly. In autumn and winter give water once a month only. Divide and repot the plants every March or April.

Petunias.—Buy either single or double-flowered seedlings in May, plant them singly in 5in. pots, and treat them as advised for geraniums. Throw away after flowering.

Creeping Jenny.—Best grown in pots in a suspended basket, so that its shoots can trail down. Procure young plants in April, plant several in a 5in. pot in a compost of equal parts soil, leaf-mould, and sand. Water by immersion three times weekly. Grow in a sunny window. In autumn and winter give water once a week. Divide and repot in March.

Campanula (Harebell).—The blue and white varieties—isophylla and isophylla alba—are pretty trailing plants for growing in pots in wire baskets suspended in sunny windows. Plant in 5in. pots in a compost of two parts loam and one part of equal proportions of leaf-mould, decayed manure, and sand. Water twice a week by immersion. When flowers form, sprinkle half a teaspoonful of Clay's Fertilizer on the soil in each pot directly after watering. Do this once a fortnight. In autumn and winter keep dug. In February cut the long shoots back closely, and repot in March.

Heliotrope.—Treat as advised for geraniums, and discard after flowering, as old plants are not worth keeping.

Chinese Primulas.—These must be purchased in flower, as they cannot be reared up to this stage except in a greenhouse. Grow in a sunny window, and give water by immersing the pot and soil only in tepid water once a week. Discard after blooming.

Persian Cyclamen.—These also are best purchased in flower. Treat as advised for primulas, and discard after flowering.

Calla Lily.—Procure strong plants, established in 6in. or 7in. pots, in autumn. Grow them in a warm room, near a sunny window, and give water by immersion twice a week. When the flower-spathes begin to form, sprinkle a teaspoonful of Clay's Fertilizer once a week over the soil. Carefully sponge the leaves occasionally with milk and water to remove dust. In May turn the plants outdoors, and let them remain there till September, then repot and bring indoors.

Genista (Cytisus racemosa).—A pretty yellow, fragrant, pea-flowered evergreen shrub. Purchase in flower in spring. Water twice a week by immersion. Directly the plant has flowered, cut off old flower-stems and keep plant indoors till June, then stand outside till autumn. Water may be required daily outdoors in hot weather. In September bring indoors, and give water once a week. Plant should be repotted every three years by an expert.

Azalea (Indian).—Another showy spring-flowering evergreen shrub, suitable for school decoration. Purchase plants established in pots and in bud in autumn, or when in flower in spring. In spring and summer give water by immersion twice a week, in autumn once a week, in winter once a fortnight. When the plant has flowered pick off faded blooms and seed-pods, keep indoors till June, then stand outside in partial shade till September, when again remove indoors. During April and May stand the plant outdoors for a short period in showery weather for the rain to cleanse the foliage. Feed occasionally with manure, as advised for Calla Lily. Repotting only needful every three or four years, and then it should be done by an expert.

V.—FOLIAGE PLANTS.

Foliage plants are, on the whole, more suitable for growing in school-rooms than flowering ones. They are less susceptible to variations of temperature; have, as a rule, tougher foliage; and, moreover, possess the advantage of being grown all the year round.

Suitable Kinds to Grow.—First of all, there is the well-known Parlour Palm (Aspidistra elatior), and its striped creamy-white and green-leaved form, variegata. Both have leathery, broad, strap-like leaves. These two cannot be surpassed for school-room culture. Then there is the Indiarubber Plant (Ficus elastica), with large oval, shining leaves; the Fig-leaf Palm, or so-called Castor Oil Plant (Fatsia japonica), with large fig-like, shining leaves; the New Zealand Pine (Araucaria excelsa), a plant with graceful branches; the Blue Gum Tree (Eucalyptus globulus), which has bluish-green leaves, emitting a fragrant and refreshing odour; the Australian Cabbage Palm (Corypha australis); and the Partridge-breasted Aloe (Aloe variegata). These may be relied upon to give satisfaction, if properly cared for. Orange and lemon trees, also date palms reared from seed obtained from ripe fruits, would also be interesting plants to grow. As to ferns, most of these are too tender to withstand rough usage. However, our native Hart's-tongue Fern (Scolopendium vulgare), Ribbon Fern (Pteris serrulata), Soft Prickly Shield Fern (Polystichum angulare Bayliæ), Scythe Fern (Cyrtomum falcatum), and the New Zealand Spleenwort (Asplenium bulbiferum) might be tried.

Culture.—The two main secrets in the successful culture of the foregoing plants are (a) careful watering, and (b) keeping the foliage clean. With regard to the first point, make it an absolute rule to supply the requisite moisture by immersing the pot and soil in a vessel of water, and never by supplying it in driblets to the soil by means of a jug or can. Use tepid water only.

Then, as to keeping the foliage clean, make it a rule to gently sponge the leaves twice a week with milk and water; the milk imparts a glossiness to the leaves. In showery weather turn all the plants outdoors for a short time to enable the rain to wash off all dust and refresh the foliage.

Foliage plants do not require repotting very often, not more than once in three years; and, when they do, a skilled gardener should be engaged to do it, as it requires a good deal of experience and special knowledge as to the kinds of soil and the methods of potting to do such work properly.

TYPICAL QUESTIONS.

In case the Teacher should be desirous of examining the pupils in their knowledge of Gardening, derived from a study of the foregoing chapters, the Author has prepared the following examples of questions, as appropriate ones to put to them. Others may of course be put at the Teacher's discretion, but those here given practically cover the subjects dealt with in the volume.

QUESTIONS ON CHAPTER I. (PAGE 9.)

1. What tools are necessary to successfully perform gardening operations? Draw sketches of a Dutch hoe and a drag hoe.

QUESTIONS ON CHAPTER II. (PAGE 11.)

1. How would you decide whether or not a garden would be benefited by draining?
2. In what way does insufficient drainage affect the soil?
3. Draw a section of a drain and explain it.
4. Show by means of sketches in what manner a secondary or side drain enters a main drain.

QUESTIONS ON CHAPTER III. (PAGE 13.)

1. How would you proceed to dig a plot of ground ?
2. Explain, with sketches, the process of "Double digging."
3. In what ways does double digging benefit the land ?
4. Distinguish between "Double digging" and "Trenching."
5. Under what condition is it advisable to trench a garden ?
6. Why is it best to do as much as possible of the digging in Autumn or Early Winter ?

QUESTIONS ON CHAPTER IV. (PAGE 17.)

1. What do you understand by the term "Soil" ?
2. Distinguish between "Organic" and "Inorganic" matter.
3. What is humus ? What are its effects on the soil ?
4. Name the necessary constituents of a fertile soil.
5. Describe a perfect soil.
6. Explain the work of the soil.
7. How could a sandy soil be improved ?
8. How could a clay soil be improved ?
9. "Lime is an essential to fertility." Explain this statement.
10. Into what divisions may artificial manures be divided
11. With what crops would you use (1) Superphosphate ; (2), Nitrate of Soda ?
12. Soot is invaluable in a garden. Why ?
13. What is meant by Rotation of crops ?
14. Why is Rotation necessary ?

QUESTIONS ON CHAPTER V. (PAGE 23.)

1. Rows of plants should run north to south. Why?

QUESTIONS ON CHAPTER VI. (PAGE 26.)

1. What are the conditions necessary for the successful germination of seeds?
2. How would you prepare a seed bed for such crops as carrots and onions?
3. How do frost, rain and wind help the gardener?
4. In what ways are the following planted: Potatoes, beans, cabbages?
5. Explain, with sketches, the preparation of potato sets.
6. How would you decide what depth to make a drill?
7. Draw, to scale, a plant label.
8. How does the sowing of beet and parsnips differ from that of other small seeds?
9. What is meant by thinning? When should it take place, and what is its use?
10. Describe the cultivation of leeks.
11. Say what you know about the harvesting and storing of potatoes.
12. Also what you know in the same way about onions.

QUESTIONS ON CHAPTER VII. (PAGE 38.)

1. "One year's seeding means seven years' weeding." Discuss this saying.
2. Why is hoeing so important an operation?

QUESTIONS ON CHAPTER VIII. (PAGE 39).

1. Distinguish between annuals, biennials and perennials.
2. Name six herbaceous perennials which should have a place in every garden.
3. What are half-hardy annuals? How would you grow them?

QUESTIONS ON CHAPTER VIII. (PAGE 39)—*continued.*

4. Give six common annuals, and state when they should be sown.
5. How would you grow biennials such as wallflowers?

QUESTIONS ON CHAPTER IX. (PAGE 41).

1. How would you prepare a compost for using in pots?
2. Describe the filling of a pot for seed sowing.
3. What is a seed?
4. Draw sketches of a seedling from germination to first rough leaves.
5. At what depths should seeds be sown?
6. In observing the germination of seeds what facts would be noted?
7. What is the use of a hot-bed?
8. How would you make up a hot-bed?
9. Describe the cultivation of tomatoes for outside.
10. How are half-hardy annuals raised?
11. What is the best method of growing celery?
12. "Hardening off" is very necessary. What does this mean?

QUESTIONS ON CHAPTER X. (PAGE 48).

1. Describe the preparation of cuttings of (1) gooseberry; (2) black currant.
2. What cuttings may be placed in a cold frame? What attention would you give the frame whilst occupied by the cuttings?
3. What is meant by "Budding"?
4. How would you proceed to bud a dwarf rose?
5. Describe the propagation of a standard rose.

QUESTIONS ON CHAPTER X. (PAGE 48)—*continued.*

6. What do you understand by the terms "stock" and "scion"?
7. Discuss the advantages and disadvantages of apple trees grown on Crab and Paradise Stocks respectively.
8. How would you graft a young seedling apple?
9. Why are fruit trees grafted? Cannot they be raised from seeds?

QUESTIONS ON CHAPTER XI. (PAGE 56).

1. What is the best time to plant young fruit trees, and why?
2. You are given a young pear tree to plant. How would you proceed?
3. How is the strawberry propagated?
4. What treatment does rhubarb require?

QUESTIONS ON CHAPTER XII. (PAGE 61).

1. What are the objects of pruning trees?
2. Explain the differences between summer and winter pruning.
3. Draw sketches of good and bad pruning cuts.
4. In what way does the pruning of black currants differ from the pruning of red currants?
5. How would you decide whether or not a fruit tree requires root-pruning?
6. If a fruit tree makes much wood and little fruit, what steps would you take to improve it?
7. What points must be borne in mind when roses are being pruned?
8. How would you prune rose trees to produce blooms for exhibition?

QUESTIONS ON CHAPTER XIII. (PAGE 67).

1. What is a wireworm? How would you distinguish it?
2. What steps would you take to fight the wireworm?
3. Distinguish between millipedes and centipedes.
4. Describe how you would proceed against an attack of greenfly.
5. What is the object of grease banding?
6. How would you deal with an attack of caterpillars on apple trees?
7. What steps would you take to minimise attacks of slugs and snails?
8. What is meant by the winter washing of fruit trees? Why is this done?
9. Briefly enumerate the different insect friends of the gardener, and state the good each does.
10. What precautions would you take to ward off potato disease?

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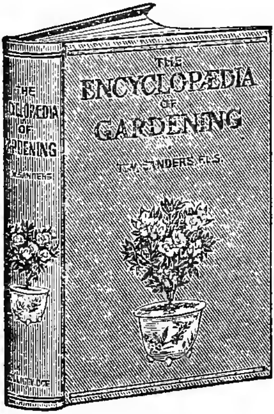

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